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Vol. V MARCH, 1921 No. 1

TABLE OF CONTENTS

Lewis M. Terman. The Status of Applied Psychology in the United States 1

Harry D. Kitson. Minor Studies in the Psychology of Advertising from the Psychological Laboratory of Indiana University 5

Thomas H. Garth. White, Indian and Negro Work Curves 14

Garry C. Myers. Control of Conduct by Suggestion: An Experiment in Americanization 26

Stephen S. Colvin. Educational Guidance and Teachers College 32

A. R. Brueckner. The Teaching Personality Quotient 39

Max Freyd. A Test Series for Journalistic Aptitude 46

Morris S. Viteles. Tests in Industry 57

S. L. Pressey. The Problem of the Unselected Group in the Standardization of Tests 64

L. W. and S. L. Pressey. Minor Studies from the Psychological Laboratory of Indiana University:

VIII. S. L. Pressey. A Preliminary Investigation of General Prognosis *vs.* "General Intelligence" 72

IX. S. L. and L. W. Pressey. Further Data with Regard to Sex Differences 78

Henry C. Link. A New Journal of Practical Psychology: A Translation of Its Introductory Article 85

Book Reviews 89

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THE
JOURNAL OF APPLIED PSYCHOLOGY

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THE STATUS OF APPLIED PSYCHOLOGY IN THE UNITED STATES

LEWIS M. TERMAN

In the August (1920) number of the *Psychological Bulletin* Dr. Boring, secretary of the American Psychological Association, summarizes statistics on the research fields in which 393 members of the association report themselves to be working. The statistics include all the members of the association except a few who failed to report on this item. A member who reported two or more fields was accredited fractionally to each of the fields, which accounts for the fractions in the figures given below. Of the 393 reporting, 53 are carrying on no research. The remaining 340 are classified as follows in Table VI of Dr. Boring's article:

FIELD OF RESEARCH	NUMBER ACCREDITED	
I. Non-psychological Fields:		
1. Philosophy	15.7	
2. Aesthetics	1.7	
3. Anthropology	2.6	
Total	20,	or 5.9%
II. Chiefly Pure Psychology:		
4. General psychology	8.7	
5. Experimental psychology	81.6	
6. Theoretical psychology	37.4	
7. Animal psychology	15.5	
8. Psychology and neurology	4.2	
Total	147.4,	or 43.4%

Field of Research	Number Accredited—*Continued*	
III. Social and Industrial Psychology:		
9. Social psychology	6.1	
10. "Applied" psychology	10.7	
11. Industrial psychology	7.4	
Total	24.2,	or 7.1%
IV. Chiefly Education:		
12. Tests	54.2	
13. Educational psychology	43.9	
14. Education (including experimental pedagogy)	13.2	
15. Clinical psychology	13.7	
16. Statistical method	1.2	
Total	126.2,	or 37.1%
V. Psychopathology:		
17. Abnormal psychology	7.2	
18. Psychiatry	2.5	
19. Psychopathology	7.0	
Total	16.7,	or 4.9%
VI. Miscellaneous	5.	or 1.5%
Grand Total	339.5	or 99.9%

Any classification like that attempted by Dr. Boring encounters certain difficulties which naturally prevent the results from being wholly unambiguous. I believe, however, that his data throw interesting light on the amount of research which is being carried on in "applied" as distinguished from "pure" psychology.

Omitting groups I and VI (non-psychological and miscellaneous fields of research) the above table shows 147.4 psychologists accredited to the field designated as "chiefly pure psychology," 126.2 to the field designated as "chiefly education," 24.2 to "social and industrial psychology," and 16.7 to "psychopathology." The last three groups may be thrown together as representing the total field of applied psychology. If these figures could be taken at their face value we would have the following division of American psychologists into "pure" and "applied."

Group II, pure.....147.4, or 47%
Groups III, IV and V, "applied".....167.1, or 53%

The matter, however, is not so simple. Lines of demarcation between research fields are hard to draw and my classification of the various fields listed by Dr. Boring into "pure" and "applied" is not wholly satisfactory. The following sources of error in particular should be mentioned:

(1) It is certain that not all of item 8 ("psychology and neurology") can rightly be accredited to "pure" psychology. Let us assume that half of the 4.2 individuals concerned should be accredited to "pure" psychology and the other half to neurology. This reduces "pure" psychology to 145.3. Moreover, since neurology may reasonably be classified as a non-psychological field, our 315 classified psychological workers are now reduced to 312.9.

(2) Doubtless some will object to classifying social psychology wholly in the "applied" group. Again we may compromise by placing half with "pure" and half with "applied" psychology. This raises "pure" psychology from 145.3 to 148.35, and reduced "applied" psychology from 167.1 to 164.05.

(3) Item 14 is classified by Dr. Boring as belonging entirely with the non-psychological subjects. However, since the item includes "experimental pedagogy" it is reasonable to suppose that a fairly large proportion of the individuals concerned could justifiably be grouped under "educational psychology" or "tests." Accrediting half to applied psychology and half to the non-psychological fields, the number in "applied" psychology is now reduced to 157.45 and the total number engaged in psychological research is reduced from 312.9 to 306.3.

On the basis of the above corrections the matter now stands as follows for the 306 members of the American Psychological Association here classified as engaged in research in the fields of "pure" and "applied" psychology:

"Pure" psychology .....148.35 or 48.5%
"Applied" psychology .....157.4 or 51.5%

From the above figures, it appears that considerably more than half of the psychological research which is being carried on by members of the American Psychological Association (which includes practically all the psychologists of the United States) falls in one or another of the fields of applied psychology. The true situation is probably even more favorable to applied psychology if, as the secretary of the association suggests, there is a greater tendency for a member to report a research field in which he formerly worked but which he is gradually leaving than a new field into which his interests

are carrying him. To the extent that such a tendency exists, the amount of research being done in the older and more established lines of psychology will of course be exaggerated by the figures. At any rate it is clear that considerably more than half the effort devoted to psychological research in the United States is in the applied fields.

This situation has developed almost wholly since 1900, and chiefly in the last decade. As the shift to applied psychology still continues, the figures will doubtless be even more striking a decade hence.

Is this trend unfavorable to psychology as a science? The more conservative will probably so interpret it, but I do not believe that the history of science warrants this view. One has only to recall how such sciences as physiology, bacteriology, chemistry, physics, and biology have been stimulated by human needs to realize that a science stands to gain rather than lose, even as pure science, when it enters the lists in the service of mankind. It is unlikely that psychology will prove an exception to the rule.

MINOR STUDIES IN THE PSYCHOLOGY OF ADVERTISING. FROM THE PSYCHOLOGICAL LABORATORY OF INDIANA UNIVERSITY

By Harry Dexter Kitson

Introduction: The Use of the Historical Method in the Investigation of Problems of Advertising

Every time an advertiser composes an advertisement he faces questions which he would like to have answered. He longs for accurate measurements which would enable him to determine the probable value of various elements in the advertisement.

Obviously the time to make these measurements is after the advertisement is completed and sent on its mission. In seeking the answer to any question regarding advertising procedure, the most reliable way is to make actual trial of a method and keep track of returns; to try out another and keep track of returns. By successive trials of different methods and by comparison of returns from each, to arrive at a conclusion showing which method is most effective.

This scientific "investigation of returns," however desirable it may be, is many times not feasible. The returns from many forms of advertising, such as bill boards and car cards, do not come in measurable quantities. Moreover, the components of an advertisement are so numerous that it is difficult to isolate the several items and discover what part of the returns is due to each. Finally the expense of experimental campaigns is very great. Altogether, despite its desirability the method can hardly be employed in wholesale fashion.

A substitute has been proposed in the "laboratory method," according to which conditions are arranged as nearly as possible like the conditions of the market; subjects are chosen typical of the prospective readers of the advertisement; and measures are obtained of their reactions. In this manner various devices may be tried out before being used on a large scale. This method seems to promise good results; it may unquestionably throw light upon many questions, such as legibility of various type-faces, appropriateness of various colors

and shades. With many problems, however, it can hardly be used effectively owing perhaps to the artificial atmosphere of the laboratory.

But we have not exhausted the possibilities of scientific measurement in advertising. In case neither of the above methods is adaptable, we may secure light from still another direction. Our aim, be it remembered, is to discover with scientific accuracy the most effective way to do a thing before we proceed to do it. If we cannot accomplish this in the market or in the laboratory we may turn to the experiences of other advertisers who have faced our problem, and by observing their solutions we may govern our procedure.

How discover their experiences? To ask them would evoke contradictions and opinions of varying degrees of reliability. Furthermore, since we seek scientific formulations of our facts, we must have figures instead of opinions. How shall we reduce the experiences of advertisers to numerical terms?

The answer is, Go to actual advertisements. As the repositories of advertising experience they picture the trend of progress and provide guide posts showing the location of pitfalls and pointing out the directions in which success has been attained. Such an approach to the problems of advertising is called the "historical method." It is very simple to describe and operate, though it naturally requires the same care and caution that scientific method ever demands. In employing it we must first state our problem in the form of a question; then go to the files of newspapers and magazines such as exist in almost every library of parts. Among the advertisements contained therein we must search for the answer to our question; then we may tabulate our results and express them graphically.

In employing this method we make use of several assumptions:

First, that the practises which have persisted over a period of years have probably been of value. We judge that those firms which did not follow these practises did not make enough money to enable them to continue to advertise, or that those firms which did continue to advertise discovered the difference between valueless and valuable practises and adopted the latter.

We must not assume that advertisers made these changes as a result of conscious discoveries. They worked mainly by trial and error. As we shall see in graphs to be presented later, they discovered the usefulness of various practises only after long-extended periods of experimentation.

We may regard modern advertising practises, then, as products of unconscious evolution. In the struggle for existence in the world of publicity, certain features have survived because of certain psychological elements of strength and fitness. They exemplify a sort of economic "survival of the fittest."

A second assumption we make in utilizing the historical method is that if advertisers had studied the practises of their predecessors they might have avoided some errors and eliminated much wastage. And we assume that by surveying the practises of the past and by discovering which ones have survived and which have failed, we may modify our practises and find a shorter and more economical road to effectiveness in advertising.

We repeat that we are not proposing the historical method as a formula for the solution of all advertising problems. We advocate it merely as one form of scientific investigation which will enable us to supplement and corroborate information secured by other means.

We shall now offer the results of a series of investigations which will demonstrate the utility of the method, and will reveal facts about advertising practise of practical value to present-day advertisers.

I. *Amount and Rate of Increase in the Use of Full-page Advertisements*

As one evidence of the growth of advertising, people often point to the increase in the use of full-page advertisements. They fail to give their contention its greatest possible weight, however, because they do not present supporting figures. The

TABLE I

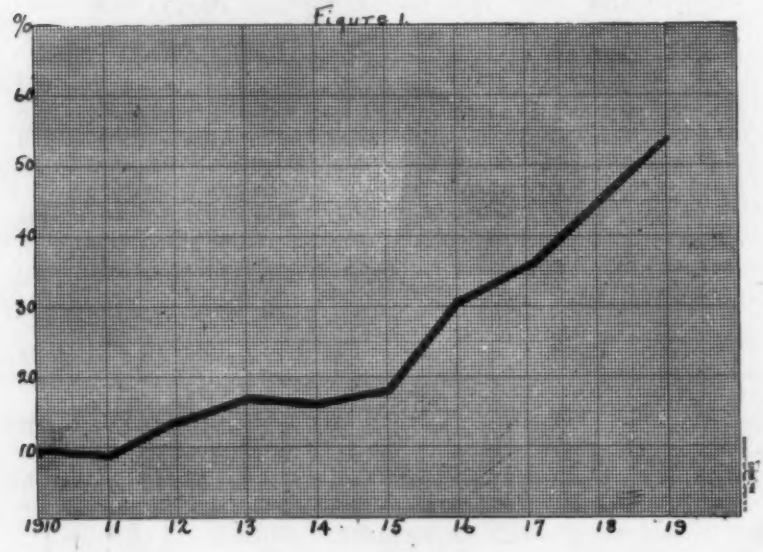
SHOWING THE NUMBER OF FULL-PAGE ADVERTISEMENTS (EXCLUSIVE OF COVER) IN THE LITERARY DIGEST FROM 1910 TO 1919

Year	Pages Devoted to Advertising	Full-page Advertisements	Per Cent
1910	1190	117	10
1911	1188	108	9
1912	1274	182	14
1913	1468	264	17
1914	1564	252	16
1915	1769	325	18
1916	2116	670	31
1917	2716	972	36
1918	2597	1162	45
*1919	2121	1155	54

*6 months.

writer undertook to supply these by investigating advertising records for ten years back in one periodical—*The Literary Digest*. The ratio which the full-page advertisements bear to the total number of pages devoted to advertising was computed. (A double-page advertisement was counted as two singles.) Results are shown in Table I and Figure 1.

From these results we may state positively that the number of full-page advertisements has increased five-fold during the past ten years. Though these figures may not serve precisely



for all periodicals, still they are derived from a study of a representative general magazine, and they are surely indicative of the trend of development.

Our figures give further light upon the growth of advertising in general. As seen in the table, the total number of pages devoted to advertising in this periodical more than doubled during the past decade. The gross number decreased in 1918, due probably to exigencies of war economies. It should be noted, however, that the ratio of full-page advertisements to this total did not decrease; it even increased. Altogether, we have here numerical confirmation of the statement that full-page advertising has increased, and strong indication that advertisers consider it a paying investment.

II. *Amount and Rate of Increase in the Height of Headlines in Full-page Advertisements*

Starch presents (page 40, Advertising) a table showing the increase in the height of headlines during the period 1870-1910, in which he shows that the height increased from 6.6 millimeters (approximately 24-point) to 12.4 millimeters (approximately 48-point). The writer undertook to ascertain if there had been any further increase since 1910. It was impossible to use the same magazine as those used by Starch (*Scribner's* and *Harper's*) as the advertising sections had been cut from the magazines in binding for the university library. *Collier's* was studied instead, with results as shown in Table II.

TABLE II

SHOWING AVERAGE HEIGHT OF HEADLINES IN FULL-PAGE ADVERTISEMENTS IN COLLIER'S FOR YEARS 1911-1920 INCLUSIVE

Year	MM.
1911	13.40
1912	12.77
1913	12.25
1914	12.15
1915	13.31
1916	12.76
1917	13.20
1918	12.52
1919	13.67
*1920	13.57

*First four months.

If we accept the usage in this representative general magazine as indicative of the trend in advertising practise, we may conclude from these figures that there has been little change in the height of headlines in full-page advertisements during the past ten years—less than half a millimeter between the height in 1911 and that in 1920. Moreover the average height for the decade is 12.9—but one-half millimeter greater than that reported by Starch for the year 1910. From this we conclude that Starch's statement, "the maximum size of display type for a magazine page has now been reached," is substantially correct; and that on the average, 48-point type has proved of greatest effectiveness.

III. *The Use of Borders with Full-page Advertisements*

In an investigation of this problem Starch found (p. 83-4, Advertising) that the use of borders with full-page advertisements in "standard magazines" increased markedly from 1880

to 1910. The percentages of full-page advertisements having borders during the years 1880, 1890, 1900, 1910 were 6, 38, 82 and 77 respectively. Starch concludes, "there has been a remarkable increase from the time when large advertisements rarely had a border until to-day (1914) nearly every one has a border." He opines that "the slight fluctuation for 1910 is probably an accidental fluctuation."

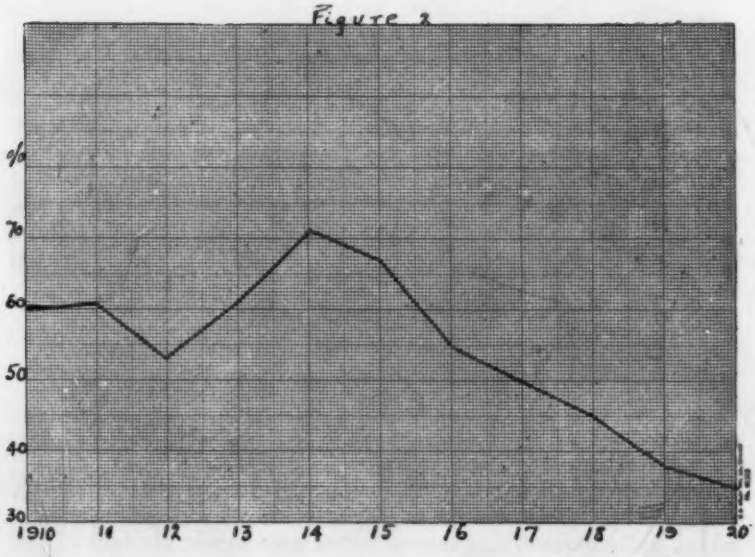
TABLE III

SHOWING THE NUMBER OF FULL-PAGE ADVERTISEMENTS WITH BORDERS IN COLLIER'S WEEKLY FROM 1910 TO 1920

Year	Full-Page Advs.	Borders	Per Cent
1910	284	171	60
1911	310	188	61
1912	285	151	53
1913	355	199	56
1914	336	239	71
1915	302	203	67
1916	465	255	55
1917	467	232	50
1918	413	189	45
1919	574	217	38
*1920	478	168	35

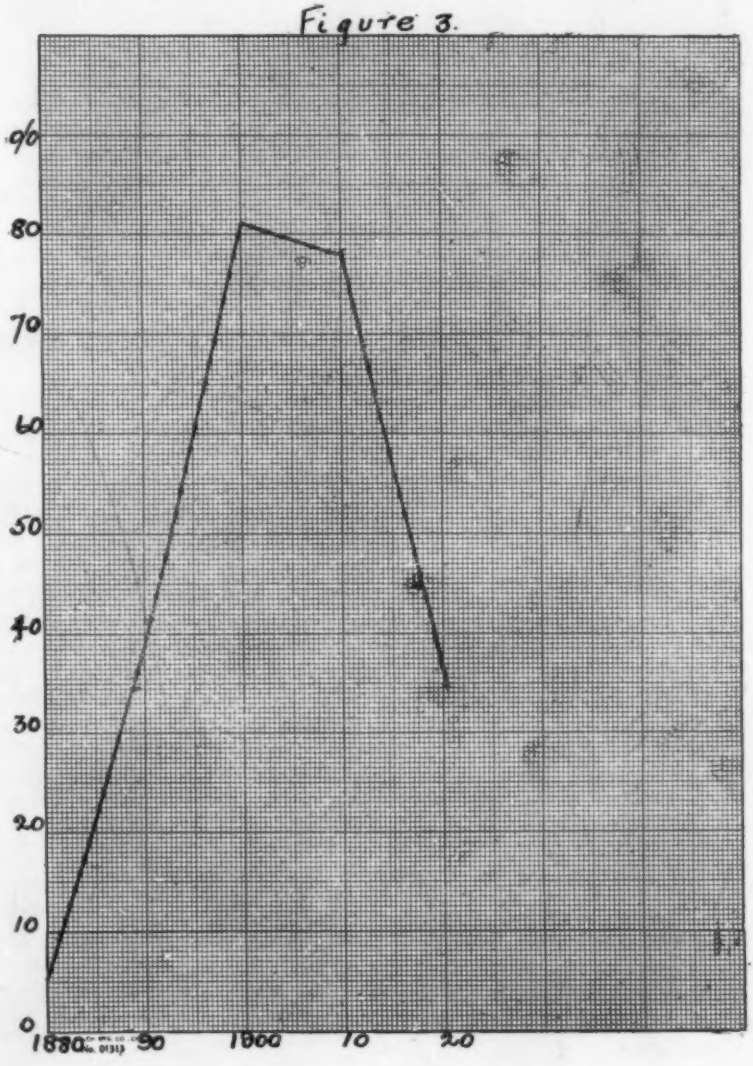
*20 issues.

Figure 3



In order to secure exact information covering the practise during the decade 1910-20, the writer conducted an investigation of the advertisements appearing in *Collier's Weekly*, with results as shown in Table III and Figure 2.

Figure 3.



These figures show that instead of a tendency toward increased use of borders with full-page advertisements, there is a tendency toward decreased use of same. Our results indicate that the drop in Starch's figures of 1910 was really significant; that the percentage is now back where it was in 1890. The tendency is shown graphically in Figure 3 based upon the data gathered by Starch, and brought down to date by the writer's investigation.

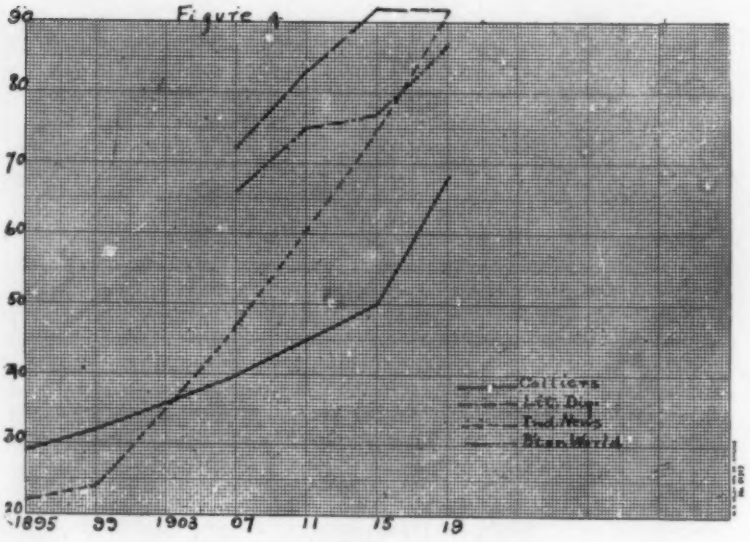
Whether the history of borders represents an evolution directed by the varying effectiveness of different methods under the conditions of the various eras, or whether it represents merely changes in fashion is difficult to determine. Undoubtedly there are fashions in advertising practise; particularly in matters that touch art-forms as closely as do borders. Fashions, we know, move in cycles. Hence, it may be that this curve represents merely the rounding out of a cycle which will later revolve in favor of borders again. Whatever is the true explanation, we may confidently conclude that among progressive advertisers of to-day, the full-page advertisement without border seems to be most in favor.

IV. *Amount and Rate of Increase in the Use of Illustrations*

In the investigation of this question four mediums were examined—two weekly magazines: *Collier's* and *The Literary Digest;* and two daily newspapers: *The Indianapolis News,* a typical metropolitan paper, and the *Bloomington* (Ind.) *World,* a typical small-town sheet. Measurements were made at four-year intervals from the issues 1895-1919. (The years 1903 and 1911 are missing in the case of the newspapers.)

The results, as shown in Figure 4 enable us to state that the relative number of illustrations has tripled during the past twenty-five years. Whereas in the earlier period scarcely *thirty* advertisements in a hundred were illustrated, to-day *ninety* in a hundred are so embellished. Though the small-size newspaper has not yet reached this percentage, both the magazines studied have done so, and the larger newspaper almost reaches it.

Using our conception of the "survival of the fittest" in advertising, we may well conclude that the use of illustrations in advertising has paid. Our figures present a striking argument to the advocates of purely "argumentative" copy and suggest that the advertiser who wishes to profit by the experience of the past will do well to use illustrations in abundance.



Summary

In this series of investigations we have presented figures bearing upon some of the important problems which every copy-writer faces: utility of full-page advertisements; height of type for headlines; borders for full-page advertisements; value of illustrations. For light we have gone to the records of advertising usage, past and present. We have reasoned that the practises which have persistently recurred have probably been valuable, and that we may save ourselves some errors by adopting them. We do not champion the "historical method" as the best method of scientific investigation in advertising but we hope that we have demonstrated its adaptability to certain types of problem, and its serviceableness to advertising practise.

NOTE:—Assistance in gathering the data for these investigations was rendered by Miss Grace Morris, and Messrs. Robert Wiles, Robert Reed, Grady Stubbs, Carlysle Burden, Robert Norman, Brantley Burcham, S. L. Crawley, students in the Psychology of Advertising at Indiana University.

WHITE, INDIAN AND NEGRO WORK CURVES

By Thomas R. Garth, University of Texas

The investigator working in the field of racial psychology is looking either for similarities or differences, or perhaps for both. On the one hand he notes the statement of Lester F. Ward, who stood actively for the equalities, or similarities:

"It is not therefore proved that intellectual equality, which can be safely predicated of all classes in the white race, in the yellow race, or in the black race, each taken by itself, cannot also be predicated of all races taken together, and it is still more clear that there is no race and no class of human beings who are incapable of assimilating the social achievement of mankind and of profitably employing the social heritage." *Applied Sociology,* Lester F. Ward, 1906, p. 110. And on the other hand he reads from Professor Giddings, who emphasizes the differences:

"It is sometimes said that we ought not to assert that the lower races have not the capacity for social evolution, because we do not know what they could do if they had opportunity. They have been in existence, however, much longer than the European races, and have accomplished immeasurably less. We are, therefore, warranted in saying that they have not the same inherent abilities." *Principles of Sociology,* F. H. Giddings, 1896, p. 328.

Woodworth's epoch making work in 1904 at the Louisiana Purchase Exposition (*Science,* 1910, No. 31, N. S.) tends to level the differences between races to almost a vanishing point in so far as more elementary processes are concerned. However, he said it was possible that the form board performances indicated differences of a racial character, but called this a mere "crumb" for the seeker of racial differences. Bruner made experiments on the hearing of primitive peoples at the same time as Woodworth and in his conclusion to the monograph by the title "The Hearing of Primitive Peoples" (*Archives of Psychology,* No. 11, July, 1908), says: "The one fact standing out most prominently as a result of these measurements is the clearly evident superiority of whites over all other races, both in the keenness and in the range of hearing sense. The evidence is so clear and

striking as to silence effectually the contention that the hearing function, inasmuch as it is of relatively less utility in the pursuits attending modern social conditions than those surrounding the life of the savage, has deteriorated and is degenerating. . . . Other things being equal those individuals or races possessing the greatest complexity and variety of reactions to elements in their respective environments likewise will be gifted with keener and more acute sensory mechanisms," pp. 111-112. On the other hand he says, on page 101 ibid, "Furthermore, if we compare this group of native Indians with those who have been in attendance at the U. S. Government Schools,"—both of these groups were included in the races compared with the whites—"it will be noted as striking that the more intelligent Indians—those having been subjected to the influences of civilization—have a better auditory acuity than do those who have been closest to nature and a natural life. So far as our American Indians of the plains are concerned, therefore, it cannot be averred that their senses deteriorate with increased contact with civilization." We are inclined to conclude from this that the differences here mentioned among the Indians are in training and not so much in innate differences.

Likewise some of the more recent investigators in race psychology place the emphasis on the differences. Mayo and Ferguson working on the Negro are inclined to believe the differences between Whites and Negroes are rather large as based on their investigations (*Archives of Psy.*, No. 28, 1913, Mayo; *Archives of Psych.*, No. 36, 1916, Ferguson), while Pyle claims that his results show specific differences between the same races (*School and Society*, Vol. 1, 1915, p. 360). In 1917 Miss Sunne tested Negro and white children in New Orleans with the Binet-Simon Scale and Yerkes' Point Scale. The conclusion reached by this investigator is that variations in individual capacities is probably as great an influence in causing differences as either race or sex. (*Jour. of App. Psy.*, No. 1, 1917, p. 83.) Rowe tested White and Indian children and found rather decided differences as indicated by the Binet-Simon Scale. (*Ped. Sem.*, No. 21, 1914, p. 456.)

The present writer in an article "Racial Differences in Mental Fatigue" (*Jour. of Applied Psy.*, June, 1920), calls attention to certain apparent differences in work curves, i.e., the tendency for Indians to fall away, or "fatigue," less than the white or negro groups who worked at the same task continuously, i.e., work in simple addition. This was true for

the groups of younger and older children of the races compared in the two categories of *attempts* and *accurates*.

Popular opinion holds to the side of great racial differences. Sometimes this persuasion is so extreme that it is called, in those cases, race prejudice. In some circles race prejudice is looked upon as innate, but it is more likely that it is a tradition with a rather long line of descent having once had a great eugenic value for keeping pure a racial stock. However, it would be well for the popular mind to take caution for we do not know but that experimental psychology may eventually render the term "inferior races" as innocuous as it seems it has the long honored term "the weaker vessel" as used in connection with sex differences.

The elements in a study of racial mental similarities or differences must be these: (1) Two socalled races R_1 and R_2, (2) an equal amount of educational opportunity, E, which should include social pressure and racial patterns of thought, and (3) psychological tests, D, within the grasp of both racial groups. We should have as a result of our experiment R_1 E D equal to, greater than, or less than R_2 E D. In this experiment the only unknown elements should be R_1 and R_2. If E could be made equal the experiment could be worked.

This element of educational opportunity-nurture, is the one causing most of the trouble in racial psychology as an uncontrollable element. It does not offer quite so much difficulty in the study of sex differences, yet it is there only in smaller degree than in racial differencs, and as it is controlled the "sex differences" tend to disappear. Since this element of education, or nurture, cannot be eliminated it would be safer to take for comparison such racial groups as have had as nearly the same educational opportunity as is possible having any disparity of this sort well in mind when we interpret the results of the experiment. Having done this, we first take the complete distributions on the scale of measurement for the groups as statements of the true facts of the case, race for race. We then combine these distributions into a total distribution of accomplishment of all the races taken together to see if we have multimodal effects. Should we find these effects we may conclude that we have evidence of types, or racial types, and there should in this case be one mode for each racial group. But should the combined distribution for the several racial groups reveal only one mode we may conclude that the test reveals no types—no real racial differences but rather similarities. (See Thorndike, *Educational Psy.*, Vol. III, p. 322, p. 347.

We may then further examine the distributed data for overlapping in the several groups and measure that, using one group distribution as a basis for the comparison.

This is what we have endeavored to do with the work curves of Whites, Indians, and Negroes. The work curves are not given here, but will be found in the article by the writer referred to above.

The question is this: Are there separate and typical work curves for Whites, for Indians, and for Negroes?

Under the title "Work Curves," *Journal of Educational Psychology*, May-June, 1919, the writer showed that for White children, one type of work curves exists for a specified sort of work (single column addition) for certain age groups, under certain conditions. The same method of handling the data is employed here.

Third and Fourth Grade Subjects—Attempted Performance.

TABLE I

PER CENT OF WORK DONE IN FIRST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
1–5	1	..	..	1
6–10	3	1	0	4
11–15	18	6	5	29
16–20	119	35	17	171
21–25	181	43	58	282
26–30	37	7	17	61
31–35	7	0	1	8
36–40	0	0	1	1
41–45	0	..	..	...
46–50	0	..	..	...
51–55	1	..	..	...
56–60	0	..	..	...
61–65	0	..	..	...
66–70	0	..	..	...
71–75	0	..	..	...
76–80	1	..	..	1
Total	368	92	99	559

TABLE II

PER CENT DONE IN FIRST 14 MINUTES

Per. Cent	W.	Ind.	Neg.	T.
16–20	1	..	..	1
21–25	0	..	..	...
26–30	1	..	..	1
31–35	3	0	1	4
36–40	9	3	2	14
41–45	37	20	7	64
46–50	55	39	36	230
51–55	21	19	36	176

TABLE II—*Continued*

Per. Cent	W.	Ind.	Neg.	T.
56–60	29	7	13	49
61–65	8	1	2	11
66–70	1	1	1	3
71–75	0	2	0	2
76–80	1	..	1	2
81–85	1	..	..	1
86–90	0	..	..	...
91–95	0	..	..	...
96–100	1	..	..	1
Total	368	92	99	559

TABLE III

PER CENT DONE IN LAST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	3	0	0	3
1– 5	...	0	1	1
6–10	1	1	2	4
11–15	24	4	6	34
16–20	114	26	44	184
21–25	196	48	43	287
26–30	22	10	3	35
31–35	6	2	0	8
36–40	2	1	0	3
Total	368	92	99	559

TABLE IV

3rd and 4th Grade—Accurate Performance.

PER CENT DONE IN FIRST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	27	5	0	32
1– 5	1	0	1	2
6–10	14	1	2	17
11–15	29	11	10	50
16–20	86	30	18	134
21–25	95	27	24	146
26–30	59	7	27	93
31–35	23	5	6	34
36–40	10	3	4	17
41–45	4	1	2	7
46–50	10	1	2	13
51–55	2	0	0	2
56–60	1	0	2	3
61–65	0	0	..	...
66–70	4	0	1	5
71–75	0	..	..	...
76–80	0	..	..	...
81–85	0	..	..	...
86–90	0	..	..	...
91–95	0	..	..	...
96–100	3	1	..	4
Total	368	92	99	559

TABLE V

PER CENT DONE IN FIRST FOURTEEN MINUTES

Per Cent.	W.	Ind.	Neg.	T.
0	7	2	0	9
1– 5	0	0	0	...
6–10	0	0	0	...
11–15	0	0	0	...
16–20	4	0	0	4
21–25	3	0	1	4
26–30	5	1	0	6
31–35	10	1	2	13
36–40	19	7	4	30
41–45	44	15	11	70
46–50	81	26	27	134
51–55	72	20	17	109
56–60	46	11	20	77
61–65	24	3	7	34
66–70	24	1	5	30
71–75	7	3	2	12
76–80	6	0	0	6
81–85	2	0	1	3
86–90	1	0	0	1
91–95	1	0	1	2
96–100	12	2	1	15
Total	368	92	99	559

TABLE VI

PER CENT DONE IN LAST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	37	8	4	49
1– 5	3	6	2	5
6–10	29	5	5	39
11–15	52	12	19	83
16–20	89	17	29	135
21–25	80	30	23	133
26–30	47	11	13	71
31–35	18	4	3	25
36–40	4	2	1	7
41–45	2	2	..	4
46–50	1	1	..	2
51–55	2	..	..	2
56–60	3	..	..	3
61–65	0	..	..	0
66–70	1	..	..	1
Total	368	92	99	559

7th and 8th Grade Subjects—Attempted Performance.

TABLE VII

PER CENT DONE IN FIRST SIX MINUTES

Per Cent	W	Ind.	Neg.	T.
1– 5	...	..	..	1
6–10	16	2	2	20
11–15	228	75	16	319
16–20	97	19	14	130
21–25	2	1	2	5
Total	343	98	34	475

TABLE VIII

PER CENT DONE IN FIRST TWENTY-TWO MINUTES

Per Cent	W.	Ind.	Neg.	T.
32–36	4	1	..	5
37–41	3	..	..	3
42–46	18	6	3	27
47–51	99	38	9	146
52–56	171	43	19	233
57–61	39	10	2	51
62–66	8	..	1	9
67–71	0	..	..	...
72–76	1	..	..	1
Total	343	98	34	475

7th and 8th Grade—Attempted.

TABLE IX

PER CENT DONE IN LAST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	1	..	..	1
1– 5	1	..	..	1
6–10	17	1	3	21
11–15	232	73	21	326
16–20	87	22	10	119
21–25	2	1	..	3
26–30	1	1	..	2
31–35	2	..	..	2
Total	343	98	34	475

7th and 8th Grade—Accurate Performance.

TABLE X

PER CENT DONE IN FIRST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	2	1	..	3
1- 5	3	..	..	3
6–10	37	14	1	52
11–15	170	47	10	227
16–20	105	25	17	147
21–25	21	9	4	34
26–30	1	2	1	4
31–35	2	..	..	2
36–40	1	..	..	1
41–45	0	..	1	1
46–50	1	..	..	1
Total	343	98	34	475

7th and 8th Accurate Performance.

TABLE XI

PER CENT DONE IN FIRST TWENTY-TWO MINUTES

Per Cent	W.	Ind.	Neg.	T.
31–35	...	1	..	1
36–40	3	..	..	3
41–45	11	3	1	15
46–50	75	31	10	116
51–55	110	49	10	169
56–60	100	13	10	123
61–66	26	1	1	28
66–70	11	..	1	12
71–75	1	..	1	2
76–80	2	..	..	2
81–85	1	..	..	1
86–90	3	..	..	3
Total	343	98	34	475

TABLE XII

PER CENT DONE IN LAST SIX MINUTES

Per Cent	W.	Ind.	Neg.	T.
0	4	..	2	6
1–5	6	..	..	6
6–10	49	20	7	76
11–15	205	44	14	263
16–20	73	25	11	109
21–25	6	5	..	11
26–30	...	4	..	4
Total	343	98	34	475

TABLE XIII

THIRD AND FOURTH GRADE ATTEMPTS

(*a*) *First Six Minutes*

	Whites	Indians	Negroes
Median	21.81%	22.08%	23.46%
% reaching median of Whites		54%	78%

(*b*) *First Half of Total Time*

	Whites	Indians	Negroes
Median	50.28%	49.88%	51.89%
% reaching median of Whites		43%	65%

(*c*) *Last Six Minutes*

	Whites	Indians	Negroes
Median	21.59%	22.69%	20.13%
% reaching median of Whites		68%	37%

TABLE XIV

THIRD AND FOURTH GRADE ACCURATES

(*a*) *First Six Minutes*

	Whites	Indians	Negroes
Median	22.41%	20.95%	24.00%
% reaching median of Whites		42%	68%

(*b*) *First Half of Total Time*

	Whites	Indians	Negroes
Median	51.52%	50.25%	52.75%
% reaching median of Whites		44%	55%

(*c*) *Last Six Minutes*

	Whites	Indians	Negroes
Median	19.82%	21.64%	19.28%
% reaching median of Whites		69%	48%

TABLE XV

SEVENTH AND EIGHTH GRADES—ATTEMPTS

(*a*) *First Six Minutes*

	Whites	Indians	Negroes
Median	14.91%	14.66%	15.95%
% reaching median of Whites		46%	64%

(*b*) *First Twenty-two Minutes*

	Whites	Indians	Negroes
Median	53.02%	52.33%	53.56%
% reaching median of Whites		43%	53%

(*c*) *Last Six Minutes*

	Whites	Indians	Negroes
Median	14.99%	14.61%	14.50%
% reaching median of Whites		46%	44%

TABLE XVI

SEVENTH AND EIGHTH GRADES—ACCURATES

(*a*) *First Six Minutes*

	Whites	Indians	Negroes
Median	15.10%	15.07%	16.67%
% reaching median of Whites		49%	73%

(*b*) *First Twenty-two Minutes*

	Whites	Indians	Negroes
Median	54.67%	52.36%	54.50%
% reaching median of Whites		26%	49%

(*c*) *Last Six Minutes*

	Whites	Indians	Negroes
Median	14.10%	14.67%	13.62%
% reaching median of Whites		57%	44%

The younger groups worked twenty-eight minutes, the older groups worked forty-two minutes and all racial groups worked under the same conditions. There were two categories—attempts and accurates.

Since distributions for all points in the curve are out of the question the curves were tapped in three places and three distributions were made of these tappings: (1) A distribution of what the individuals of a group did in the first six minutes, (2) a distribution of what had been done by the time about one half of the total working period had elapsed, and (3) a distribution of what the individuals did in the last six minutes. The tables presented herewith give the racial group distributions—Whites, Indians, and Negroes separately, and the three racial groups combined into a total in each instance.

It will be seen that wherever we tap the total curve (made of the three racial groups of performers) the distribution for same has a single mode, whether it be the case of distribution at the beginning of the curve, the middle of the curve or the end of it. Though each racial curve has its idiosyncrasies as found in that curve itself this idiosyncrasy is lost in the total distribution. And these idiosyncrasies by the present test of the data show no great departure from the common curve. This single modality holds for all the curves—younger and older groups in both attempts and accuracy, and although the curves have been tapped in only three places, the beginning, the middle, and the end, these are very vital points and it is likely that tapping at other points would reveal the same situation—a uni-modal distribution curve. In consequence this handling of the data is but a support of the claim that

none of these curves are racial in a typical sense but each contributes toward a common *human* work curve, and to that extent stands for similarities rather than differences.

We now in the second place take the expanded data and examine it for overlapping using as a basis of comparison the medians of the White groups.

Granting that these three groups really belong in one large group, the question still remains: How does one sub-group compare with another? See Tables XIII, XIV, XV, and XVI. It will be seen that there are only three instances in which the overlapping of the White and Indian distributions is as much as 60% and above, whereas there are six cases of overlapping above that amount when the Whites and Negros are compared. The most significant instance is where at the beginning 78% of the younger Negroes attained the median of the younger Whites in attempts. Only 37% of them attained the median of the Whites for attempts at the end, whereas 68% of the Indians of the younger group attained this same White median at this point. In fact, as we have shown elsewhere, the Indians make a good showing when compared with the Whites and Negroes with respect to the last six minutes of work in all instances excepting where only 46% of the older group attain the median of the Whites of the older group in the attempts category, for this part of the common curve, and the Negroes consistently fall below the median performance of the Whites and Indians during the last six minutes of work.

The figures representing what was done by the time about half of the period of the total working time had elapsed are interesting. If one works absolutely at a regular rate he should, of course, have done 50% of his work by the time half of his total working period was up. By running over the above mentioned tables (Tables XIII, XIV, XV, and XVI), one may observe that consistently more Indians were inclined to do less of their total work than the median White did, and that more Negroes were inclined to do more of their work than the median White by the fourteenth minute, for the younger workers, and the twenty-second minute for the older workers. This means then that slightly more than half of the Indians were even as deliberate, or more so, in their work as the median White, and that half of the Negroes were inclined to be less deliberate than the median White—with one exception only: as in the accurates category of the older Negroes where they did just the same part of their work as did the Whites.

These measures of overlapping are significant as far as they go and are to be taken into very careful consideration before one takes a stand for a belief in racial work curves of Whites, Indians, and Negroes or in just a common *human* work curve. It is a fact that they incline one to see differences and we may add that mixture of blood in the Indians and in the Negroes may have prevented these differences from being more apparent.

CONTROL OF CONDUCT BY SUGGESTION: AN EXPERIMENT IN AMERICANIZATION

By GARRY C. MYERS, Cleveland School of Education, Cleveland, Ohio

When the course of study and the texts* which are now used in the Americanization Schools of the Army were developed at the First Recruit Educational Center at Camp Upton there was a conscious attempt to make as the warp and woof of the lessons a propaganda for that school, for more education by the soldier and his home folks, for the Army, for the United States government, and for America and American ideals. It was assumed that all suggestions of proper habits and virtues are most effective when camouflaged and especially when the learner unwittingly becomes a teacher of those duties and ideals which it is desired he shall get. The learner is not told that he should sleep with his windows open, that he should brush his teeth and clothes, stand erect, sit erect, take care of his appearance and respect the great men and flag of our country. Instead the learner becomes the reader or the writer of a letter to a friend in which he tells that he has developed these desirable traits, attitudes and virtues and suggests indirectly or directly to this friend that the latter could do the same and attain the same virtues and attributes. Throughout, the learner suggests the very virtues to himself which he seems to be suggesting to his friends. A few sample lessons follow:

Co. D., Recruit Educational Center,
Camp Upton, N. Y.
December 7, 1920.

Dear Mother:

It is pretty cold some morning when we must jump out at Reveille but we must move so fast then that we do not mind it. A soldier does not feel the cold much because he sleeps with his windows open. When I came to the army I was sure I would take cold if I slept where the windows were open, but I soon learned that fresh air is the best cure for a cold. I have never felt so well in all my life as I feel

* Army Lessons in English by Capt. Garry C. Myers, War Department, 1920.

now. Almost every soldier says the same. The army is the place to be. I wish Zebediah would join the army. Then he would learn to clean his teeth, to stand erect, sit erect and walk erect, and to keep his elbows out of his pockets.

If you see Nellie tell her I still like cake.

Jeremiah Butler.

From the next lesson is the following:

"You know that Theodore Roosevelt had four boys, and they were all soldiers. One boy, whose name was Quentin, gave up his life for his country in the Great War. We honor his memory and we honor the memory of his father. Every good American is ready to do the same as Quentin Roosevelt did. A long time ago, when our country was fighting for freedom a great American soldier by the name of Nathan Hale said as his last words, 'I only regret that I have but one life to give for my country.' Don't you think that was wonderful?"

Moreover, those first lessons of the course leading up to letter-writing aim to "sell" the course and the school to the learner; to suggest to him that he wants to learn and why he wants to learn. The first sentence he reads is "I want to learn English" and the fifth is "I want to learn to write a letter home." In his eighth lesson he reads as a sample a first letter to his sweetheart:

Co. B, Recruit Educational Center,
Camp Upton, N. Y.
January 8, 1920.

Dear Nellie:

I got your letter and the sergeant read it for me. The next letter I am going to read myself for I am learning to read and write English. I am writing this letter myself. It is my first letter. I hope you like it. I like the army very well. I want you to see me drill. I can drill very well. We drill every day.

Jim Jones.

In his next lesson, which is a letter to his mother, he reads:

Co. C, Recruit Educational Center,
Camp Upton, N. Y.
February 1, 1920.

My dear Mother:

This is my first letter home. I am going to write you a letter every week. I got a long letter from Nellie. She said she saw you. The sergeant read it for me but her next

letter I am going to read myself. I want to read a good book. It is a hard job to learn to read and write but a good soldier likes a hard job. I have a good captain. He is a friend to every soldier.

Robert Brown.

In these letters he suggests to himself, that he is going to read the next letter from his sweetheart, that he is going to read a good book, that he is doing well, a big job and that his captain is his friend. In succeeding lessons he reads and writes from sample letters the following suggestions:

"Every good soldier knows how to handle a gun."

"I am sorry that I did not go to school at home, I did not think then that I could learn, but I am sure now that I can learn. I can write letters to Nellie and I can read her letters to me."

"I have read a few letters by Theodore Roosevelt to his boys and I want to learn to read some speeches by Woodrow Wilson, President of the United States."

In the third grade, his second lesson is a letter to Nellie from which he reads:

"I have learned to brush my teeth, to keep my head and shoulders up, and to keep my uniform neat and clean. I wish I could get my teeth to look as clean and as pretty as your teeth."

It should be remembered that these are not mere statements but personal expressions to one, Nellie. The dramatization carries over very well, so well that the average soldier enthusiastically plays the part in "writing" these letters.

The non-English soldier who reads the following from a letter to "Dear Bozo" speaks with pride:

"When we go to New York we can see men and women coming into a new land just as we came five years ago, and we know how they feel. Of course, we want them to like America as we like America. We want them to know that the cleanest, best and most useful American is the soldier. Therefore when I go to New York I want to look my best."

Careful records have been gathered which indicate that the men take over these letters by phrases, sentences and often in their entirety, when they write home. Most of these men have limited mental content; so they are glad to grasp at almost any word, phrase or sentence suggested. Undoubtedly they write home much which they at first did not believe and over which they were not always enthusiastic. Furthermore, those at home, because they look upon these soldiers, their near friends, with esteem, catch up the suggestions.

As good evidence that the lessons read by the soldier tended to express themselves in what that soldier actually did write home there are given below copies of several letters or excerpts from them. It should be noted that practically every sentiment expressed in these examples had appeared once or several times in the lesson-letters of the reading texts.

Some Actual Letters-Home

" Dear Mother:

Yesterday I received the socks which you sent me. I can write letters now as you see. I am sure you will find me looking better then when I left. I am a better man I look much better and feel much better then I did before I enlisted in the army and I know much more. I am for the army."

" I always keep my clothes clean and have to keep my teeth clean. I have to brush my teeth. I received the socks that you sent me."

Dear Sister Ethel

I have ben in the army now about three monts an when I first came in the armey I Dident rely know what our flag ment. But it means much more than red whit an blue cloth Every stich an every thread means many American soldiers who suffered died an bled. For thear country an thear country is our country an I am proud to be a soldier They did not suffer an die for themselfs but for thear country for their farther mother an brothers sisters an sweethart. An I have sure learned to honor our flag it means more than you could think Tell brother I wish he would join the Army."*

Dear Mother.

I have not heard from you for long time. I hope you are not ill. I have been in the American army three months and I like it very well. When I came in the army I could nôt read or write English, but now I can read and write a little it has been three years that time when I cane in this country and am in school now to want learn good English "

Dear Mother

I am in school today I like to go to school We go to school every morning and every evening. I would like to see you. I may be home before long on furlough. I feel much better since I joined the army. I like the army fine. We have

* Foot-Note.—This is a faithful reproduction in paraphrase of a lesson-letter on the American flag.

plenty of good clothes to wear. we go to the moving picture show every night. We have plenty of good books to read and we have a good time."
" dear mother yesterday from a walk i learned to write letters I am go to write every week I am a soldier I am go to read a book from abraham lincoln as I will close "
" I am. this army. 6 months and this camp. Upton i learn. som. end. go to scoold. every. day. learned read. and. write- now. he can write letter myself home. before and. go to my sergent read my letter. now i can. read. myself. I write letter and read were well."

" My dear Mother.

This is my frist letter to you. I am surprise you that I am writing. to let you now that I am Well. I hope your our Sampn. Mother I have A good Captain he is a friend to every Soldier. I go to School every day and I now how to read. and writer. our. Captain learn. os how to handle A gun. and we like to drill. every Soldier likes to handle a gun. good luck."
" I am for the Army because oncle Sam dew his best for me I like you see me now I wight 150 lbs. my Capt said I contined aet so much I wight 200 lbs the Co. B, his the best Co in the Camp Upton I got a very good Capt."

" My dear Mother.

this is my frost letter I write you, and I hope to see you soon. dear Mother I am filled much better now and much strong I am sure you will find me looking better then when I left home.
Dear Mother I like the army very will we have plenty eat and good clothes"
" before I Came to the army I could not write my name every menth I get a good money I have good clothes plenty to eat I do not pay for them "

Another avenue of control of conduct of the illiterate soldier at Camp Upton was in the public speaking course. The soldier in this class presumably was getting training to help him qualify for recruiting duty. This very purpose suggested to him that he must make speeches magnifying the virtues of the school and of the army. He proceeded therefore in impromptu speeches to tell of what the school had done for him. Consequently there developed a strong rivalry among the members of this class (public speaking being voluntary) to make the most embellished speech about the very things

which were suggested in the lesson letters. Some who had scarcely begun to read and write extended their imagination so as to tell, as if it were true, of how well they had learned to read and write English since coming to that school. By suggesting to a number of the old time "chronic-kickers" of the Camp that they would make good speakers, many of them became strong competitors for first place among the boosters of the school, their company, the camp and the army. They kept at this boosting for several class periods until they really began to believe what they were saying and to act accordingly. Thus by their own suggestions they became effectual missionaries for morale.

Little doubt is there that in education one of the most effectual means for controlling conduct is by suggestion.

EDUCATIONAL GUIDANCE AND TESTS IN COLLEGE*

By Stephen S. Colvin, Director of the School of Education, Brown University, Providence, Rhode Island

At the beginning of the academic year 1919-20 Brown University inaugurated a system of educational advice and direction for its students, the details of which are still in the making. The most essential features so far put into operation are the following:

(1) On the first day of the college year the first-year men are given the Thorndike Mental Test for College Freshmen.

(2) A few weeks later these men are given the so-called Brown Psychological Test. The Brown University Test is composed of two parts; the first requiring twenty-five minutes for administration and the second, thirty minutes. Separate elements of the test are: completion, vocabulary, opposites, mixed relations, facts-and-conclusions, and arithmetic. This test requires about a third of the time of the Thorndike Test, but shows results almost identical, correlating with the Thorndike Test by a Pearson coefficient around .90 and frequently showing a closer agreement with the Thorndike Test than do separate parts of the Thorndike Test itself. The reason for giving both tests is to check up the occasional contradictory results that are found and to discover their causes.

(3) Early in the year each new man is required to fill out a personnel card which through a series of questions seeks to discover:

(a) The purpose the student has in coming to college.
(b) His academic interests while in high school.
(c) His activities in various sports and out-door life.
(d) His reading interests.
(e) His vocational aptitudes and interests.

In addition to answering questions concerning these matters the student is required to give an estimate of himself in regard to twenty-five qualities relating to intelligence, habits of study, character, temperament, social interests and health.

* This paper was read at Atlantic City, Feb. 25, 1921, before the National Vocational Guidance Association.

(4) Later in the year each student is interviewed by a member of the Committee on Educational Advice and Direction, who after consultation with the student fills out a second personnel card, which is filed with the card previously made out by the student. On this second card are recorded the scores made in the psychological tests and all academic grades that the student may have received, in addition to other items of interest such as whether the student entered on condition, whether he has received any academic honors, whether he has been warned for poor work or is on probation. Also there is added any information the student may be able to give concerning his secondary school career; the academic and vocational interests and plans that he may have; his habits of study, with particular reference to the place, time, technique and amount of study; his outside interests and distractions, including work for self-support, extra-curricula college activities, and amusements and recreations.

In addition, from the interview with the student, his advisor discovers and records the following facts, as far as possible: (a) the birth place of the student and of his parents; (b) the number of children in the family and the order of birth of the student; (c) the occupation of the father and his approximate income; (d) the occupation and schooling of brothers and sisters with particular reference to the grade that they have completed in school and their age at the time of finishing this grade; (e) the age at which the student graduated from high school together with any other information concerning his school career.

(5) Early in the year a blank is sent to the principal of the school in which the student prepared for college, asking information on the following points: (a) the rank of the student in his class, with the number of members in the class; (b) the courses in which the student did his best and his poorest work; (c) the extra-curricula activities of the student; (d) his interests; (e) his qualities of initiative and leadership. In addition, the principal is asked to give an estimate in regard to qualities of intelligence, character and social adaptabilities possessed by the student.

(6) During the first half of the freshman year the students are required to attend a course of orientation lectures given by various administrative officers and instructors. These lectures are designed to inform the student concerning important details of college life, ideals and methods of study, hygiene and personal habits, and the aims and content of general fields of knowledge represented in the curriculum.

(7) The students are again interviewed by their advisors at the end of their sophomore and junior years. At the end of the sophomore year each student is required, under direction, to select certain courses and groups of studies in terms of a definite scholarly interest or a life career. These studies are to satisfy the requirement for concentration, not, however, in terms of departments of knowledge (as was previously the case) but in terms of interests and aptitudes.

(8) In addition to these regular interviews, students are required to consult with the chairman of the Committee whenever particular reasons for such consultation arise, such as poor or unusually excellent college work, on disparity between psychological scores and college records. One particular function of the Committee is to stimulate students of high ability and attainment to do work worthy of their capacities. For this reason, the direction of reading for final honors, open only to students of unusual intelligence and academic achievements, is in the hands of the Committee.

(9) Finally all students in the University are urged to consult with the Chairman of the Committee during his general office hours in regard to any problems connected with their college work or their life careers which may be important for them.

It will be seen from this account that psychological tests play by no means the entire part in the work of guiding the student. They, however, are extremely useful in various ways and are frequently of great service in clearing up doubtful points in regard to the students' abilities, aptitudes and achievements. They have been found particularly valuable in the following ways:

1. They throw some light on the question as to whether a student is better suited for a professional career or for business pursuits. They cannot do this, however, in any but a most general manner since the range of intelligence among college men is narrow and since practically all who remain for any length of time in college receive scores that place them somewhere in the professional occupational intelligence group as determined by the army intelligence ratings. Brown men obtain a median intelligence score that is somewhat higher than that of civil engineers and medical officers and somewhat lower than that of army chaplains and engineering officers. Occasionally a student receives a score that would place him on the occupational level of clerical and semi-professional workers, but never so low as that of the skilled laborer. At

present the general practice of the advisors is to urge men of high intelligence ratings to enter some one of the professions, provided that in addition their character, interests and special capacities seem to qualify them for such a life career. This practice is based not only on the consideration of the abilities of the students but also on the needs of society. It is found that very few young men, even those of high ability and character, are planning on careers in medicine, law, teaching and the ministry. On the other hand, the large majority of students, as far as they have formed any definite purposes, are thinking of business, though in a rather hazy fashion.

2. The tests indicate to an extent the type of mind that a student possesses. For example,—a student who does much better in his college work than on his mental tests may be a slow but rather accurate thinker who learns less readily than some of his fellow students but who retains and assimilates what he once masters. There is some evidence to show that psychological examinations of the type of the Thorndike and Brown tests are unfair to men who are plodders but careful and accurate thinkers. Here is a specific case in point.

A student of the present junior class who appears to be a man of at least average ability and of more than average earnestness of purpose received a score in his psychological tests that indicated him to be of unsuitable intelligence to succeed in college work. His college grades, however, have been above the average. When questioned about his psychological tests he said that they took him by surprise and that the time limits bothered him. He finds that he can respond rapidly to something that he has memorized, but cannot think under pressure. The student was later retested with an alternative mental examination in which no time limit was fixed for the various sub-tests. The result was that he raised his score by thirteen points, confirming the diagnosis that he was of about median college intelligence and that he owed his success largely to careful and regular habits of study rather than to brilliancy or rapidity of thinking.

3. Intelligence tests make possible a distinction between character qualities and mental alertness. It is evident from the examination of Brown students that intelligence considered by itself is by no means a perfect measure of success or failure in college. Of course, intelligence is undoubtedly positively correlated with character, and an intelligence rating is never a rating for pure mental ability alone, but is also to a degree an index of volitional and other character qualities. But further than this, numerous cases have been discovered in which

the disagreement between intelligence scores and college grades is clearly due to qualities of character and temperament. Generally the disagreement is evidenced by students who reecive high intelligence ratings and low college grades; sometimes the reverse is true. Examples follow:

A member of the present sophomore class scored high in all his mental examinations. He graduated from high school at the age of seventeen, standing in the upper tenth of his class. His college record, however, has been disappointing. He confesses that he is lazy in his mental habits and lacks determination and ambition to study.

In contrast to this student is another member of the same class, who is clearly somewhat below the average in intelligence but who is determined to succeed in his work and who is making good grades because of his will-to-do.

Some students succeed or fail in college because of emotional qualities. As an illustration of this fact the following case is in point: A member of the present sophomore class obtained a high rating in the Thorndike Test and an average rating in the Brown Test, the lower rating in the latter test being due probably to physical disability while taking this test—the student having fainted a short time before, something that he says occurs quite frequently. He graduated from high school at nineteen, having been out of school two years because of ill health. He has two sisters and one brother, all of whom are at least one year in advance of their normal school grade. There seems to be little doubt that the student's intelligence is above the average; his work in college, however, has so far been almost a complete failure. He is now on final probation and has a record of six E's (failures) out of a total of fifteen courses taken. He says that he is extremely nervous and that he cannot endure the strain of the ordinary college examinations. He got on well in high school because of the fact that his grades were so high that he was not obliged to take formal tests to pass his courses. In the formal college tests he "gets chills and is all-gone."

4. At times tests throw light on the home environment and educational equipment of the student. Sometimes students who score relatively low in their psychological tests do so because of the fact that they hear a foreign language spoken at home and for the most part think in a foreign language. This is particularly true of a group of Italian students now at Brown. Their college work is markedly better than what seems probable from the prognosis made on the basis of their mental scores.

In this connection it may be interesting to note that in a recent comparison of the results of mental tests given pupils in one grade in a Providence school the results of the Terman revision of the Binet Tests were found in general to agree rather closely with the results of the National Intelligence Tests as far as American children were concerned. In the case of children of Italian parentage, however, the mental ages were from one to three years lower in the National Tests than in the Terman Tests. The tentative conclusion is that the National Tests, largely linguistic in their nature, failed to reveal the real intelligence of the Italian children because of their unfavorable home environment as far as the speaking and reading of English is concerned.

5. Tests sometimes reveal the presence or lack of scholarly ambitions and proper education ideals. Students often take the attitude of treating their college work as a task to be performed rather than an opportunity for improvement. This is not true merely of those who are content to work only just enough to "get by," but this point of view is all too frequently found among men of high ability who can get really good grades on an amount of study often averaging not more than six hours a week. It is very clear that our higher institutions of learning, in common with our lower schools, are not challenging the abilities of their best students.

6. Tests often show whether it is desirable for a student to continue in college or to withdraw. Intelligence tests have not as yet been used at Brown to determine college entrance, except in a few exceptional cases. They frequently indicate, however, whether it is worth while to keep a man in college or not. If a student has an extremely low intelligence score, and if his grades are markedly below average, there is little use in keeping him on semester after semester. It is equally true that a student of ability who constantly fails is undesirable college material because of his lack of character and ideals.

7. The results of the tests frequently serve as incentive to students to do work up to the level of their mental abilities. It is the writer's practice to show to a student who is doing college work distinctly below his real ability his case in a graphic form. For this purpose a wall chart is made which indicates each student's position in the psychological ratings and also in his academic achievement. It evidently produces some impression on a man to say to him,—"Here you stand in the first third of your class in your psychological scores,

and yet you are here (twenty points lower) in your college rating. You are not living up to your possibilities. You know the facts; now it is up to you." I am confident that such an objective presentation carries vastly more weight than any good advice could possibly bring to bear. Facts are more impressive than general statements and sometimes produce results which no amount of exhortation could accomplish.

THE TEACHING PERSONALITY QUOTIENT

By A. R. Brubacher

It is merely stating the obvious to say that profound scholarship is not even presumptive evidence of teaching power. The converse is equally true, that teaching power does not necessarily betoken great scholarship. Our colleges have great teachers whose scholarship is mediocre and both colleges and schools have suffered from men of deep, broad and sound scholarship whose teaching was and is a travesty on their high profession.

In training teachers, persons are discovered who develop an intellectual acumen out of all proportion to their social and volitional power. These persons come to the end of their course with high ratings for scholarship, with a thorough and broad knowledge of professional technique, but when they attempt the teaching process they fail utterly to project either themselves or their subject into the class before them. We say of them that they are immature, that they lack social experience, that they lack personality. This judgment is tempered by our knowledge of numerous cases of a like sort, where greater maturity, wider contact with life, have developed a dynamic personality. And for this reason we are properly cautious in our judgment of all minus or merely colorless personalities among teacher recruits. We hesitate to declare that any specified person will never develop this teaching power; but in this hesitation lies the source of the continual stream of poor teachers, teacher failures, the derelicts of the profession.

This personal power is the unknown quantity in higher education but particularly in teacher training. The school of education addresses itself to the task of developing scholarship and to the inculcation of special methods in a restricted field. The college entrance requirements are defined wholly in terms of scholarship, the test being a test of the intellect, and that largely a test of retentive memory. That memory is a very small element in teaching power has not disturbed our equanimity; that intellect is only a fraction of the teacher's dynamics, has not affected our plans. We have made the humble confession that personality is a vague term, diffi-

cult of definition, a complex resultant of heredity, of environment, experience and training, and this humility covers a host of professional sins.

We have made no consistent effort to analyze the teaching personality, either for the purpose of eliminating from the ranks of teachers in training, those who have it not; nor yet for the purpose of developing and increasing and improving those phases of personality which are present at the outset in a small degree.

The intelligence test, so called, is the first hopeful sign that there is a way out. It gives promise that there is a means of testing personal power, of discovering personal qualities which rest in the emotions and the will either in whole or in part. And tests of the motives which lie behind human behavior, if they can be made, will shed bright light on personality and will bring into high relief the elements which are the bases of the teaching personality in particular.

The "intelligence quotient" is, true to its name, primarily a test of the intellect. Its superiority to the conventional educational tests lies in the fact that it tests not only *memory*, but the *power* of *perception*, the *association of ideas, reason*, the power of *judgment, comprehension, ingenuity*, etc. That is, while the conventional examination may call for any or all of the intellectual qualities enumerated, it is difficult and even impossible to say how much of the student's reaction is a pure memory product; but in the intelligence tests, the other qualities are momentarily in focus and memory is not. This is in itself a great gain. But for the analysis and the discovery of the teaching personality still other qualities must be brought into focus, qualities that are wholly absent from or are present only by implication in the intelligence test.

For the sake of conformity to familiar terminology, I propose to derive a "Teaching Personality Quotient." Our study at the New York State College for Teachers divides the matter into four phases, comparable roughly with, and including the Intelligence Quotient. These phases are as follows: A Personal History Quotient; an Intelligence Quotient; a Behavior Quotient; and a Special Information Quotient.

(1) The Personal History Quotient. The personal history of the prospective teacher is the first phase in point of time. It has many elements. Environment shapes personal characteristics. Nationality and the occupational history of the family are to be recorded. The cultural background of the family states the educational opportunities of parents and grandparents and indicates the character of the student's home

life. The high school record continues to record the student's scholastic achievements as in the past. A physical examination throws light on the student's physical and mental condition. There will be a careful record regarding the vocational, avocational and recreational interests so far as such interests have become definite. And the student's achievements will be tabulated—achievements in leadership, in organization, in carrying responsibility, in exhibiting courage, persistence, industry, etc. The *personal history quotient* will serve as the basis for professional guidance throughout the educating period. Merely to state the case for this quotient is to show its immense superiority over the present inadequate matriculation process, consisting as it does, almost exclusively of the scholastic record.

(2) The Intelligence Quotient. The intelligence test will be first of all confirmatory of the personal history. It will illuminate the scholastic record as contained in the high school certificate or in the entrance examination. It will be invaluable in checking our conventional judgments on scholastic attainment. But the intelligence quotient will do much more. It will furnish an index of intellectual power, which, taken in conjunction with the student's record of youthful achievement, will enable the college to understand shortcomings and to provide intelligent corrective measures for failures in specific things. For example, if the test discloses a relatively weak power of association, reason and judgment, the correct diagnosis may be followed by appropriate prescriptions. This fact gives greater importance to these elements in the intelligence quotient than to such elements as mental alertness and retentive memory which will probably not yield greatly to training and education. In this respect our use of the intelligence quotient differs radically from the use made by the army.

(3) The Behavior Quotient. It is not unusual for students to make violent changes in their social habits when they pass from school to college. Leadership demonstrated in the school, may not be in evidence in the larger social group. Avocational interests may be changed. Even vocational interests may be affected by the new environment. The persistence exhibited in the school, the purposefulness of the earlier time may not be apparent. These changes in behavior are insignificant in our present scheme because we make no effort to build the college life in consistent fashion on the life habits developed in the pre-college period. Viewed merely as an intellectual process, the college career has only incidental relationship to this body of habit which accompanies the entering Freshman.

But in a larger scheme of personality cultivation it is extremely important to insure continuity of development for such fundamental characteristics as were noted above, persistence, purposefulness, leadership, vocational and avocational interests. Unfortunately the college has not yet sensed its responsibility here, and has no machinery for the discovery of personal characteristics, for the systematic and continued development of well defined qualities, for the strengthening of qualities that appear weak or only nascent as yet. I believe this is an unscientific procedure in all higher education. Teacher training surely cannot attack its problem intelligently without this systematic study and continuous development of these simpler phases of personality.

The Behavior Quotient will set up this desirable basis of personality cultivation. It will rate the Freshman on those points which determine character, those qualities which give color to his behavior in the class room, among his associates, in all social relations, everywhere. The rating for behavior must of course be restricted to those qualities which can either be tested under controlled conditions, or which can be observed and recorded with accuracy. The Freshman will readily suspect the purpose of the test and yield the expected result because he detects the desire of the tester. This will vitiate the results of the test. Consequently, it will be highly important to select those qualities of conduct, emotional and volitional and intellectual, which lend themselves best to the purposes of the test. In fact, it will require long and patient endeavor, with a study of hundreds of cases, to establish reliable results. But of this I feel certain at the outset. A small list of qualities may be tested under strict laboratory conditions, and other qualities may be observed and tabulated during the college course.

(a) Behavior by Test. I propose the following list of qualities for the determination of the behavior quotient by test. Some of these may later have to be eliminated, others may be brought in as more desirable. Each constitutes an important part of the teaching personality.

(1) *Sympathy with and understanding of children.* The instinct of play is absent in some persons. The playful child annoys them. Naiveté is incomprehensible to these people. Fairy tales, childish imaginings are foolishness to them. The absence of this quality will be a veritable blindspot in the teaching personality.

(2) *Resourcefulness.* The ability to use ways and means that are not superficial or readily apparent, constitutes an indispensable element of teaching personality.

(3) *Directive ability.* The ability to determine the direction which a group of people or a class shall take in thought or action.

(4) *Self Control.* The ability to reserve judgment, to resist seductive suggestion, to control the emotions, to maintain equanimity in spite of provocation.

(5) *Tact.* This is a composite of many qualities but for purposes of testing is conceived to be the power of quick analysis of a social situation, a correct understanding of the requirements, and a rapid marshalling of forces to meet the situation. Tact brings the best solution with the least irritation to the situation. A rare, but an indispensable quality in the teaching personality.

(6) *Purpose.* A clear view of things as they ought to be and a definite desire to make them so.

(7) *Organizing ability.* The ability to adopt means to ends, whether the situation be mental or physical.

(8) *Speed of Reaction.* The ability to respond rapidly to social situations.

(9) *Aesthetic Sense.* A sense of beauty; good taste; pride in personal appearance, including neatness and cleanliness.

(10) *Humor.* A cheerful view of life; a right sense of proportion; the habit of correct self appraisal, understanding the relationship between dignity and self-conceit.

(11) *Pervasive attention.* The ability to give primary attention to one thing and at the same time attend in secondary degree on all objects within the sensory field. This is a prerequisite to class control.

There will probably be immediate agreement that the qualities named are fundamental if not indispensable in the teaching personality. But can they be tested? Our presumption is that social situations can be constructed and questions asked regarding the conduct recommended, which will clearly define the character of the student under test. For example:

"Of a number of recorded actions, which do *you* approve?

"Given these or those conditions, what will *you* do?

"In a specified and complicated situation, what solution do you offer?"

A faculty committee in the New York State College for Teachers is at work on the construction of tests. The plan

is to extend the method of the intelligence test so as to cover cases where intelligence, together with feeling and will, affect social situations in the form of concrete behavior. The list of qualities was selected from a large total; Dr. Fairchild's "Perfect Human Being Chart" for instance, was rich in suggestiveness; but the question, Can it be tested? reduced the list to the qualities named.

(b) Behavior-by Observation. There are qualities that can be observed but cannot be disclosed and appraised by test under controlled conditions. They are fully as important as any that have been named and will shed much light on the teaching personality. The behavior quotient cannot be determined with finality without them and so other means must be devised for their study and appraisal. This means lies in the systematic observations by those members of a faculty who have frequent opportunity for such study. This is the major officer in many institutions, he who gives the fundamental courses which form the major interest of the student; he who advises the student on all matters pertaining to electives and the satisfaction of the requirements leading to graduation and to a degree. This same officer, may also, in the school of education, give instruction in the special method offered in the major subject. His judgment is based on many meetings, after observing the student in many situations, and should command correspondingly great respect. Other instructors may have opportunity for such systematic observation.

The qualities to be submitted for this type of personality study are the following:

Enthusiasm	Adaptability
Industry	Loyalty
Responsibleness	Respectfulness
Cooperation	Poise
Aesthetic Sense	Independence

A special rating card will be provided and a definite set of values assigned.

(4) The Special Information Quotient. This consists of the student's record in his major and minor courses, his scholarship record generally, and his work in special method. This record can be compiled finally, only at the end of the college course and will be valuable in guiding the prospective teacher into a position but not in guiding him during his period of preparation. This phase of the study offers nothing different from the usual college scholarship record. The variation lies rather in the use that is to be made of this record. Hereto-

fore scholarship rating was the only definite judgment passed on students. By the proposed plan it will take its place in a larger scheme.

It is not time to propose final relative values for each of the quotients here proposed. Our investigation has not progressed far enough for that. But it is already clear that the plan will be helpful in passing judgment on the graduate who seeks recommendation to a teaching position. That the employing agency—school superintendent or trustee or college president, will find a judgment based on such a personality frame trustworthy, is also quite likely. That such employing agency would scan the personal history quotient and the behavior quotient with as much care as the special information quotient is at least probable.

The personality study here proposed seeks to do three specific things. (1) It endeavors to bring together under the four heads, all the evidence regarding the student's personal characteristics and to provide the information needed for professional guidance. (2) It seeks in extreme cases to enable the college or the school of education to advise individual students against preparing to become teachers, or against continuing such preparation already begun. (3) It seeks to provide an intelligent basis for genuine personality cultivation. By shifting the center of emphasis, even slightly from scholarship alone, by bringing in elements of character and character building, it will make of teacher training what it should be, a process of discovering and developing the dynamic personality. The chief value will lie, not in the elimination of the minus personality, but in training and developing the plus personality. By discovering in each individual student the best combination of personal qualities which he possesses, and by the nurture of this innate strength, the educating process may compensate his defects. For we all have personality negatives. It is the projective power of our plus characteristics, that wins success, that determines the size of the teaching personality quotient.

A TEST SERIES FOR JOURNALISTIC APTITUDE

By MAX FREYD, Research Fellow, Carnegie Institute of Technology[1]

The present study was begun as an attempt to devise and evaluate a series of psychological tests for use in vocational selection and guidance in the field of journalism; more specifically, to provide for college instructors in journalism a means of foretelling the probable success of their students as reporters. The advantages of such tests to both student and instructor need no great elaboration: they provide for the elimination of unfit students from classes in journalism, enabling the instructor to give more time and attention to those who have the requisite ability, and sparing the unfit student the years of effort to acquire information which will bring him no adequate return.

The criterion by which the tests will eventually be evaluated is success in newspaper reporting after graduation from college. They will be given to a sufficient number of undergraduates to insure a thorough trial. In technique this study resembles closely that of Dr. L. L. Thurstone's study of engineering aptitude: the tests will be given to journalism students, preferably in their first year at college, and the test scores will be compared with criteria of progress in college, and eventually with success in reporting after graduation.

The difficulties usually met with in such analyses were encountered in determining the traits of the successful reporter. Text-books of journalism are full of psychographic pictures of the profession. Münsterberg, in his "Vocation and Learning," listed what he thought were the qualifications for reporting. These analyses consist mainly of moral qualities whose presence in a remarkable amount might well be conceived as constituting a drawback to success. A study of reporters on the job, discussions with newspaper men, and a careful sifting of the literature on the subject, led me to the

[1] The material in this report was gathered at the University of Washington during the academic year 1919-1920. The writer is indebted to Dr. Stevenson Smith for advice throughout the study.

conclusion that the following traits, above others, were responsible for good reporting:

High degree of intelligence	Social ability
Broad range of information, especially on current events	"Nose for news"
	"Nerve"
Good memory	Keen interest in reporting
Language ability	

Tests were devised for all except social ability, "nerve," and interest in reporting. Recent refinements in tests for volitional and social traits and in the use of interest questionnaires make it possible to provide objective measures of all the items in the list in any future study along this line.

1. *The Tests*

The series originally used consisted of nine tests printed in booklet form for group testing and so arranged that only one test was visible at a time. Each test was timed, and the whole series could be given during the regular class period. A revised series is being used at present, but all the results given herein were obtained with the original series.

The following description of the tests is accompanied by a statement of the purpose for which each test was devised. The tests, of course, measure a multitude of other characteristics besides the ones mentioned, but our assumption is that they measure the traits mentioned more efficiently than they do other traits.

Test 1 is intended to measure the complex ability known as "a nose for news," which means the ability to see an event immediately in terms of its news value and to recognize the items that would be of the greatest interest to the greatest number of readers of a newspaper. The term may also be taken to include the ability to know where to look for news. It is probably acquired largely through training, but the extent to which the student possesses the ability before his training may be indicative of his future performance in the vocation.

This test consists of ten pairs of statements, all of which refer to a tenement house fire. The subject is required to indicate by a check which of the items in each pair would be more important in a news story of the fire, assuming that he is a reporter covering the fire for a newspaper in the city in which it occurred. In constructing the test an effort was made to pair an item of major importance with one of minor importance. The following are samples:

( ) While responding to the alarm, a hose truck skidded into a telephone post, but was not damaged and proceeded to the fire.

( ) The tenement house was a three-story brick building, erected in 1880.

( ) At the time of its construction the building was one of the show places of the city.

( ) A crowd of several hundred people watched the fire.

( ) The firemen had difficulty in preventing the flames from spreading to neighboring buildings.

( ) The fire started at 6:30 a. m. and was not put out until 9:30 a. m.

In order to determine the "correct" answers, this test was sent to the editors of forty leading newspapers of the country and to a number of instructors in journalism. The items in the test were evaluated on the basis of the nineteen answers which were received. In most cases there was a large majority for one of the items in each pair.[2]

Test 2 has a purpose similar to that of Test 1, namely, to find out how well the student can solve problems in reporting without previous practice. The test consists of fourteen situations which might confront a reporter, to each of which three solutions are offered. The subject checks with a number

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[2] In scoring this test, it is desirable that three factors be taken into consideration: (1) The value assigned to the right answer must bear some relation to the percentage of the total votes cast that it received; (2) Inaccuracy must be penalized, since there is a choice between only two answers; and (3) The difference in score between checking the right answer and checking the wrong answer in a pair must be proportional to the value assigned to the right answer.

Let x represent the total number of votes cast for both statements in a pair, and let y represent the number of votes cast for that statement which received the greater number of votes. By assigning values to the right answers in proportion to the ratio y/x the first factor is accounted for. Values were assigned to the right statements according to the following table:

y/x	Value assigned
.50 to .55	0
.56 to .65	1
.66 to .75	2
.76 to .85	3
.86 to .95	4
.96 to 1.00	5

In order to account for the second and third factors the same amount is subtracted from the individual's total score for checking a wrong answer as would have been added to it if he had checked the correct answer. Thus a difference in score between checking the right answer and checking the wrong one is always double the credit assigned to the right answer.

TELEPHONE COMPANY
E. JONES DENTIST
E. JONES DENTIST
Z. TAYLOR LAWYER
SALE STARTS TODAY-APRIL 14TH
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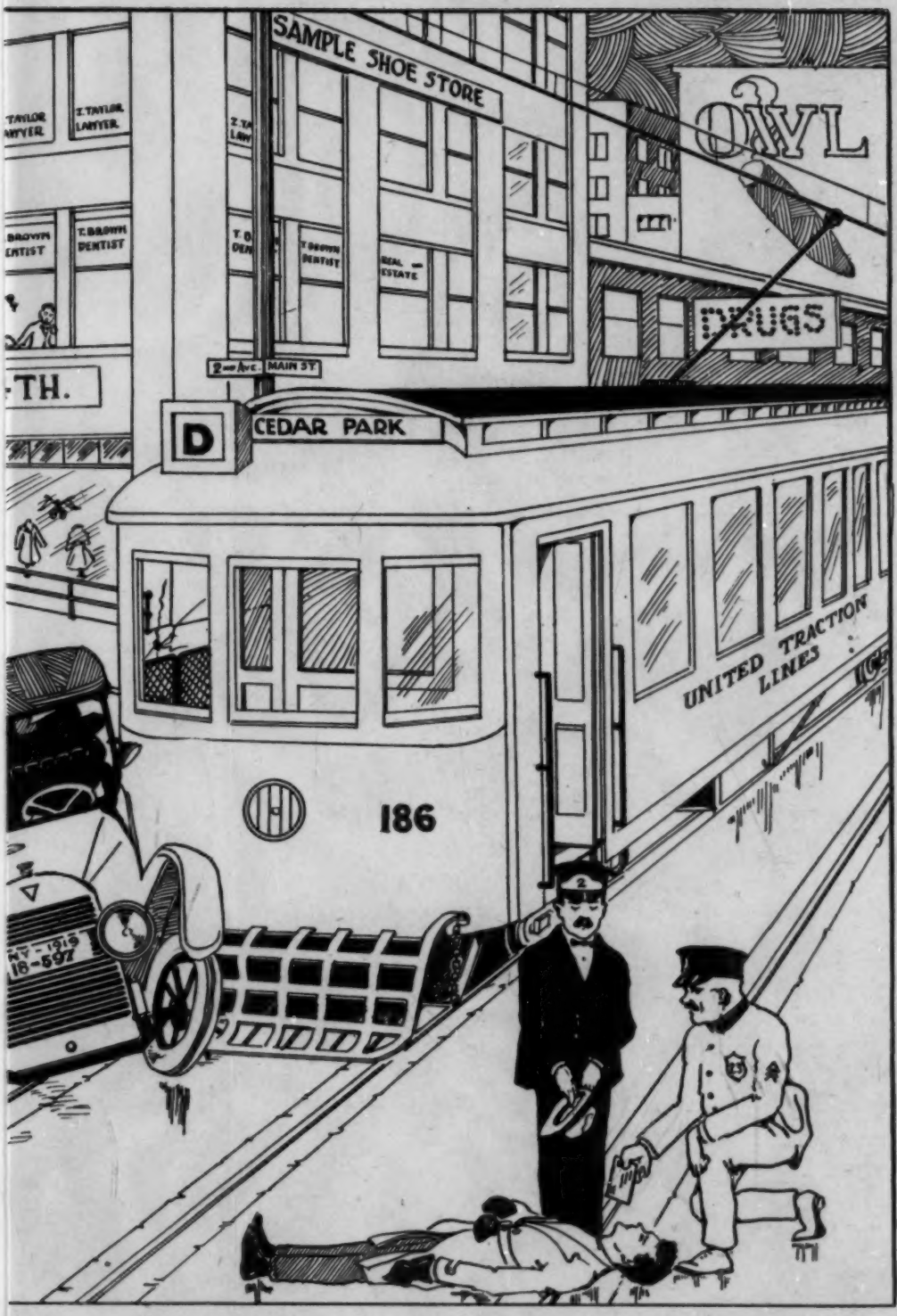
WHEELER INSURANCE COMPANY


SAMPLE SHOE STORE
OWL
DRUGS
T. BROWN DENTIST
REAL ESTATE
2nd Ave. MAIN ST.
D
CEDAR PARK
UNITED TRACTION LINES
186

1 the solution which he considers the best of the three, and with a 2 the second best solution. Sample questions are:

If you were assigned to get the facts about a bank failure, what would you do first?

( ) Go to the bank and knock at the doors.
( ) Call the bank on the phone.
( ) Call up the office of the bank examiner.

What would you do if a great fire broke out a few hours after you had quit work for the day?

( ) Hunt up the owner of the property and interview him.
( ) Call up your office.
( ) Get all the data you could about the fire from direct observation.

What would you do if a prominent man gave you a copy of a speech he was about to deliver before a large audience, and while delivering it he made some extreme statements that did not appear in the written copy?

( ) Look him up and ask him if he meant those statements for publication.
( ) Leave those remarks out of your account, as probably being due to the excitement of the occasion, and not expressing his real point of view.
( ) Include those statements in your account, along with the written speech.

In order to evaluate the answers, this test was sent to the same group as the first test. In all except three of the problems there was a very large majority for one of the three answers. So many of the men overlooked registering their second choice that it was decided to score the test merely on the first choice.

One criticism of this test which is not without point is that the subject if actually confronted with the situation would not do what he indicated. It is probable that the same may be said of the editors who filled out the test. The test merely shows how well the student agrees with editors of long experience in solving theoretical problems.

Test 3 measures auditory memory for meaningful material. A short selection saturated with facts is read to the students, after which they are shown a printed copy of the selection in which blank lines have been substituted for many of the important facts. They are asked to fill in the gaps from memory. The test is scored by means of a stencil which is placed over the printed copy.

Tests 4, 5, 6, and 9 were intended to be measures of various phases of language ability. The following are taken from Test 4:

( ) learned ( ) educated ( ) informed	Possessing information
( ) narcotic ( ) astringent ( ) sedative	Having the quality of causing insensibility or stupor.
( ) autonomy ( ) freedom ( ) emancipation	The power, right or condition of self-government.

The subjects place a check before the one word in each group to which the definition applies. This may be called a test of care in the use of words. Its main disadvantage is its brevity, since only twelve definitions are used.

Test 5 consists of an exciting extract from Reade's "The Cloister and the Hearth," in which a number of typographical errors occur. The frequency of the errors is directly proportional to the thrillingness of the material; the first part, which is comparatively slow, contains few errors, whereas the last paragraph, which contains one of the most thrilling climaxes in literature, is full of typographical errors. Besides its intended function as a test of one phase of language ability, the test offers some analogy to being assigned to report a prize fight: the excitement of the occasion may cause the reporter to forget his mission.

Test 6 consists of four lists of words, as follows:

I	II	III	IV
thief	to give	assemblage	to say
pickpocket	to award	crowd	to speak
bandit	to donate	audience	to utter

On blank lines below each list the subject enters more words with meanings similar to the three in the list. One great difficulty with this test consists in the scoring. There are a great many words just on the borderline between similar and dissimilar which cannot be scored either way without injustice. Intelligent students probably tend to be more discriminating in the choice of the words which they write down. In scoring, most of the borderline words were considered correct.

Test 7 is constructed on the method suggested by Stern for establishing the validity of testimony of a witness. The

subjects are asked fifty questions covering the details of a picture which they were allowed to look at for one minute. The picture shows a collision between an automobile and a street-car, and is full of detail. The questions cover such items as the license number of the automobile, the amount of damage to the automobile, the number and route of the street-car, the number of the motorman and the policeman, the time of day (shown by a jeweler's clock), the month and day of month (shown by a sale sign over a store), and year (license pad of the automobile). The function tested seems to be related to the reporter's task.

Test 8 is similar in form to Alpha Test 8, but the items are of the kind that a reporter might be expected to know. The following are illustrative:

GOTHAM is a nickname of CHICAGO, NEW YORK, PHILADELPHIA, BOSTON.
IRVIN COBB is a BASEBALL PLAYER, CARTOONIST, AUTHOR, ARCHITECT.
The present POPE is called BENEDICT, PIUS, LEO, INNOCENT.
The United States declared war on Germany in 1915, 1916, 1917, 1918.
MERGENTHALER perfected the LINOTYPE, COMPTOMETER, TELEGRAPH, MIMEOGRAPH.

There are sixty such items in the test.

The student who gets a high score in this test has shown enough interest in his chosen profession to acquire information, through newspapers or periodicals, which will be of use to him later on.

Test 9 is a word-building test, using the letters: A E I O L N R T. All words constructed must have four or more letters. Word-building tests have been classed as measures of verbal imagination.

The total score was computed simply by adding the scores in the individual tests. A correlation coefficient of .97 was found between this method and that of adding ranks in the individual tests. No attempt will be made to weight the tests until they have been finally evaluated.

2. *The Subjects*

This series of tests was given to nine groups of subjects:

A. 29 Juniors, School of Journalism, University of Washington.
B. 16 Seniors, School of Journalism, University of Washington.
C. 47 Freshmen School of Journalism, University of Oregon.
D. 24 Sophomores, School of Journalism, University of Oregon.
E. 18 Juniors, School of Journalism, University of Oregon.
F. 7 Seniors, School of Journalism, University of Oregon.
G. 85 First and Second Year Non-Journalism Students, University of Washington.

H. 35 Third and Fourth Year Non-Journalism Students, University of Washington.
J. 10 Reporters.

All of these groups except J were tested during January and February, 1920. The first six groups include most of the students in the classes from which they were drawn. At the University of Washington the School of Journalism is open only to upper-classmen. It was impossible to test the Pre-Journalism students in the College of Liberal Arts. Groups G and H were composed of students enrolled in a class in Applied Psychology. They were for the most part in the Colleges of Liberal Arts, Education, and Science. The reporters, who were all on the staff of a metropolitan newspaper, were given the tests under conditions which almost warrant discarding their scores. The men varied greatly in age, education, and experience.

3. *The Results*

While final evaluation of the tests as indicators of success in reporting must be delayed a number of years, a study of the scores may throw some light on the possible future value of the tests.

Some tentative statements about the tests are suggested by the comparison of the median scores for the various groups in each test. Table I gives this information.

TABLE I

MEDIAN SCORE FOR EACH GROUP IN EACH TEST. A SHORTER TIME LIMIT WAS ALLOWED IN GIVING TEST 9 TO GROUPS G AND H. TESTS 3, 6, AND 9 WERE NOT GIVEN TO GROUP J. THE FIGURES UNDER RANGE ARE THE LOWEST AND HIGHEST SCORES ACTUALLY MADE

	Group									
Test	A	B	C	D	E	F	G	H	J	Range
1.....	31.0	37.5	26.6	31.5	24.5	31.0	31.6	31.8	35.5	0–50
2.....	41.7	45.0	33.5	34.5	36.0	39.5	32.3	34.5	41.0	5–61
3.....	16.3	16.5	13.6	12.0	13.0	14.0	10.7	9.0	....	0–31
4.....	7.5	7.9	6.4	6.2	7.0	6.8	6.3	5.9	7.0	1–11
5.....	20.5	32.0	19.0	20.8	18.0	18.0	18.0	15.7	27.5	0–59
6.....	13.7	14.6	13.7	14.3	14.6	14.0	13.3	12.8	....	3–30
7.....	15.0	17.0	12.5	13.4	11.8	11.0	13.0	14.0	13.5	0–34
8.....	21.5	31.5	18.0	19.3	17.5	21.0	18.3	18.3	34.5	3–53
6.....	8.7	9.3	7.3	9.2	8.3	6.5	3.9	3.4	....	0–18
Total Score..	172.5	201.5	149.0	162.5	161.0	152.5	....	....	....	32–293

The University of Washington journalism seniors excel the juniors in all of the tests, but for the University of Oregon students Test 2 is the only one which shows a relationship between median score and year in college.

The University of Washington students of journalism as a whole are distinctly superior to the non-journalism students

in all of the tests. Non-journalism upper-classmen and lower-classmen do about equally well in the tests. In Tests 1, 2, 5, and 8 the reporters do better on the average than the journalism students. Some of the tests seem to distinguish between those who have journalistic inclinations or ability and those who have not.

The correlation coefficients given below were obtained by Pearson's method of correlation of grades, the formula being $r=2\cos\frac{\pi}{3}(1-R)-1$, in which $R=1-\frac{6\Sigma g}{N^3-1}$

Each test was correlated with Alpha (54 cases), with the following results:

Test	
1	.36
2	.45
3	.58
4	.48
5	.69
6	.30
7	.41
8	.65
9	.43
Total Score	.56

These figures are low enough to allow for differences of an appreciable amount if both series of tests are correlated with an objective criterion.

Test 8 in the present series and Alpha Test 8 show a correlation of .62. Tests 3 and 7 correlate .40.

The instructors in journalism were asked to rate their students on the journalistic aptitude which they displayed. These faculty estimates may not be correct, but a student leaving college with the recommendation of the faculty will have his classmates at a disadvantage in obtaining his first position. On the other hand, many students who are considered poor material by their instructors may be given a start by friends or relatives and prove very successful. It remains to be seen what predictive value the faculty ratings have, and whether or not the tests predict the students' future success more accurately.

The University of Washington students were rated by three faculty members and the University of Oregon students by two. With some unimportant variations in wording, the following simple scale was used:

"Rate each of the students who took the journalism tests as follows:

"1, if you think that the student has an aptitude for journalism and if you think that he will succeed in newspaper work.

"2, if you are doubtful about the student's aptitude or do not know him well enough yet to care to pass judgment on him.

"3, if you think that the student has no aptitude for journalism and will not make good in newspaper work."

Each student's ratings were averaged to obtain his final rating. Correlations with test scores are given in Table II.

TABLE II

CORRELATIONS OF FACULTY RATINGS WITH TEST SCORES. ALL FIGURES ARE POSITIVE UNLESS INDICATED NEGATIVE. UNDER AVERAGE ARE GIVEN THE MEANS OF THE SIX COEFFICIENTS FOR EACH TEST

	Group						
Test	A	B	C	D	E	F	Average
1.....	—.20	.34	.29	—.04	.47	—.42	.07
2.....	.13	.45	.31	—.35	.32	.32	.20
3.....	.18	.42	.29	.40	.63	.42	.39
4.....	.43	—.30	.36	.00	.11	.50	.18
5.....	.26	—.07	.28	.35	—.04	.73	.25
6.....	.39	.67	—.18	—.11	.04	.52	.22
7.....	—.08	.54	.26	.24	—.07	.00	.15
8.....	.13	.54	.61	.46	.38	.12	.37
9.....	.13	.62	.09	.57	—.06	.21	.26
Total Score.	.23	.75	.28	.19	.26	.58	.38

These figures show that in general the more advanced the students the higher is the correlation between test scores and ratings. The amount of correlation also varies inversely as the size of the group tested. Supposedly instructors are better able to judge the ability of their students after knowing them longer and meeting them in smaller groups. Selection, however, places a practical limit on the increase in correlation, at least with the present rating scale. If the courses in journalism were extended beyond the customary four years we should eventually find every student rated 1.

Passing to the correlation figures for the individual tests, we find that Test 6 is the only one whose figures show a consistent increase with year in college. Test 8 shows an increase for the Washington students and a decrease for the Oregon students. For Group B Tests 4 and 5 correlate negatively, whereas for Group F they show a high positive correlation. For each of the tests there is one coefficient of +.45 or more, and for seven of them there are one or more negative coefficients. Tests 3 and 8 have no negative coefficients. We may conclude that as far as this table is concerned, Tests 3, 6, and 8 are the most efficient.

The scores were available for Groups A and B in an intelligence test devised for the purpose of picking officer-material from among naval recruits at the University of Washington during the late war. The test consisted of six parts: cancellation, opposites, memory span, true and false statements, parts of fifty, and perception of number.[3] The correlations between this test and faculty ratings on journalistic aptitude were .14 for Group A and .37 for Group B, in both cases considerably lower than the correlations obtained with the journalism tests.

No Alpha grades were available for any of the journalism students, but many of the non-journalism students had been given the test. The correlation figures on page 53 were obtained on non-journalism students. We may find out indirectly what common factors there are between the ratings on journalistic aptitude and Alpha scores by correlating the coefficients of each test with Alpha given above (page 53) with each of the seven columns of coefficients in Table II.[4] The following are the correlations obtained:

Group	A	B	C	D	E	F	Average
r	.41	—.38	.57	.53	.18	.61	.45

If these figures are taken as probable indices of the amount of correlation between ratings and Alpha, we see immediately that with the exception of Group F the instructors tend to rate their students at first according to their general intelligence and as they know them better they rate them on another ability which is closely related to those measured by the journalism tests.

4. *Summary*

1. For some unknown reason the tentative criteria show more positive results with the University of Washington students of journalism than with those of the University of Oregon.

[3] The "parts of fifty" test consisted of twenty rows of eight figures each. Two figures in each line added together equaled fifty. The subject was required to cross out these two figures in each line. The "perception of number" test consisted of sixty rows of circles. The subject was required to write on a blank line after each row the number of circles in the row. The circles were at even distances apart, so that it was not necessary to count out the number of circles in every line. In case a line contained more circles than the preceding one, it was merely necessary to add the number of circles extending beyond the preceding line.

[4] For a theoretical discussion of this method, the reader is referred to Hart and Spearman: "General Ability, Its Existence and Nature," *Brit. Jour. of Psychol.*, Vol. V, 1912.

2. Tests 1, 2, 5, and 8 tend to distinguish between reporters, students of journalism, and non-journalism students.

3. In general, faculty ratings on the aptitude of their students agree closer with test results when the instructors meet their students in small groups than when they meet them in large classes.

4. In general, the longer the instructors know the students, the closer do their ratings agree with the journalism test scores.

5. The scores in Tests 3 and 6 show the most consistent agreement with faculty ratings.

6. The results lend support to the analogy method of devising tests.

The final evaluation of the tests must be delayed until the students have been out of college for five or ten years. In grading them on their success a rating scale will be used which will contain such items as the importance of the newspaper on which the man is employed, importance of his position, his salary, etc.

A revised edition of the test series was printed during March, 1920, and was given to students of journalism at the Universities of Minnesota, Illinois, Indiana, Kansas, and Iowa, and Ohio State University. Copies of the revised series may be obtained by addressing the writer at Carnegie Institute of Technology, Pittsburgh.

TESTS IN INDUSTRY*

By Morris S. Viteles, A. M., University of Pennsylvania

The vocational psychologist concerns himself with finding the right man for the right job. There are two avenues of approach to this: that of choosing a worker to fill a particular job and that of choosing the job which is most suitable for the particular worker. Industry is interested in getting the worker for the job and concerns itself little with the latter and more difficult problem which confronts the vocational counsellor. Both problems, however, involve an analysis of jobs from the point of view of the specific mental abilities which the worker must possess in order to attain proficiency in any one of them and the development of scientifically accurate measures of such ability. "Tests are the devices by which mental abilities can be measured." Industry has lagged far behind education in adopting a quantitative standard for the measurement of the ability of individuals. It has selected the worker haphazardly and the function of selection has often been assigned to one of the menials in the executive hierarchy of industry. Link, in his Employment Psychology, cites an amusing example of this haphazard method of selecting workers. "One large manufacturing concern," he writes, "has appointed as monarch of the 'hiring-on-window' a man who had the misfortune to lose a leg in the company's employ. As a consequence of this loss he was given his present life job which he performs to the queen's taste. He was induced to describe his methods and they were something as follows. 'On Monday I turns down all the men with white collars, on Tuesdays all with blue eyes, Wednesday all with black eyes. Red-headed men I never hires, and there do be days when I have a grouch and hires every tenth man.'" This is perhaps an exaggeration, but it illustrates the haphazard method of selection which industry still largely employs. Numerous examples can be cited which illustrate the important part played by the personality and tastes of the employment agent in selection. The head of a billing department of a

* An address delivered at the Conference on "Tests in Relation to Vocational Guidance" at the annual meeting of the National Vocational Guidance Assn., Atlantic City, Feb. 26, 1921.

department store for which I was preparing tests was praising his force and, took me on a personally conducted tour of his department to point out his star workers. "Now this girl," he said, pointing to one, "is going to make a crackerjack worker. I just hired her this week, but I know it. I know that every time I hire a girl with that kind of a face, round, serious looking, smart, she makes a fine biller. Now I must have been asleep when I hired that one. She won't make good," and he indicated a petite, dark-haired girl whose features, in my opinion, radiated intelligence and ability. The girls whom he had indicated as the possessors of pleasing, intelligent faces to me seemed dull and lifeless. I am free to admit that it was altogether a question of personal tastes, but it was such personal likes which dominated the choice of workers for this department, and for other departments in the store—and resulted in the choice of personnel lacking uniformity and with greatly varying competency for the different jobs in the store.

It is by reason of this absence of uniformity in selection that tests are replacing in industry the haphazard method of selection in which the only measure of the applicant's fitness for the job is the judgment of the foreman, or even the better trained judgment of the employment manager on the basis of mere observation. Sometimes those who make the selection are using such additional criteria as the contour of the applicant's face, whether it is convex or concave, the length of the fingers, the texture of the skin, the shape of the head and any number of other unreliable standards which pseudo-scientists are recommending to industrial executives. The readiness of industry to employ these methods is an indication of the need which is felt for some more definite criterion of selection than that of mere observation.

Two kinds of tests are being used by industry to provide these more definite standards of selection;—trade tests and psychological tests. The former are being used to determine whether the applicants for a job in which experience is required actually possesses such experience. They are measures of trade experience involving tasks which only an experienced worker in the trade can perform. The carpenter is given a block of wood, a hammer and a chisel and instructed to make a certain kind of a joint. The inside electrician is given material and is instructed to put up some wiring. Such tests were used extensively in the army during the late war to pick the skilled workers to build cantonments, do electrical wiring, run auto trucks, etc. The psychological tests, on the

other hand, are such as measure the ability of the inexperienced applicant for a position to attain proficiency in the job for which he is applying. The dividing line between the two types of tests is not a clear cut one at times, but the fundamental difference is an essential one. I shall confine myself, in this paper, to a discussion of the psychological tests, with particular reference to their use in selection, and not for promotion, transfers, the regulation of wages and any number of other uses to which they are put in industry.

The psychological tests, may be divided into two classes, tests of general intelligence and tests for specific abilities. The general intelligence test, such as the Army Alpha, the Binet Simon test, the Otis test, and many of the so-called intelligence tests which are being used to grade school children are really measures of the performance level of the individual The college professor stands higher on the performance level than the skilled tradesman, and the skilled worker on a higher performance level than the laborer. The higher the performance level of an individual the higher the score he will make on a test for general intelligence, which may be defined as a combination of innate specific abilities, educational and social opportunities. Such tests have a very limited use in industry. They are used in the first place, to shut out from employment the feeble-minded, those who are altogether unfit for any job in the plant by reason of deficiency in mentality. They are also used to select workers for jobs in which success depends, to a very great extent, upon a high level of general intelligence, namely the executive positions. For selection for the great mass of skilled and semi-skilled jobs, for office jobs and simple clerical jobs, the general intelligence test cannot be used. The carpenter and the toolmaker, for example, must stand on approximately the same level with reference to general intelligence, but very different specific abilities are rquired for these trades.

In an analysis of the tests for general intelligence given in the army it was found that laborers and farmers averaged C—in general intelligence; bricklayers, cooks, bakers, general machinists, shop carpenters and workers in a number of other trades averaged C; clerks, photographers, R. R. clerks, etc., averaged C+. If trade competency correlated with general intelligence it could be predicted that everybody who ranked C in the army alpha would make an equally good bricklayer, cook, baker or general machinist. It is a matter of common experience that many bricklayers could not be trusted to prepare a meal successfully even after much training, and that

many first class chefs could be taught bricklaying for many years and would never succeed in aligning properly a row of bricks. Trade competency is related to specific abilities which the individual possesses. Specific abilities are those innate traits which enable an individual to perform some specialized task. In the schools we find good pupils who are poor in arithmetic, good arithmeticians who do not learn to spell well, and individuals who are poor in spelling, arithmetic, reading and all other school subjects who do remarkably well in the classes in carpentry and clay modelling. A special set of specific abilities go into each of these, and differences in the specific abilities which individuals possess account for differences in arithmetic, spelling, reading competencies and so forth. In the same manner competency for different jobs in industry depends upon specific abilities. A motorman on a trolley car must possess a high degree of distribution of attention, alertness, planfulness and the ability to react quickly with a learned response to external stimuli. The conductor, on the same car, needs distribution of attention, alertness, planfulness in a more limited degree, but the last complex ability is not needed. The conductor on certain roads needs a certain amount of arithmetical competency, the motorman need possess none of this. The general intelligence needed for these two jobs is about the same, but there are many men who make good conductors who would be dangerous characters as motormen by reason of deficiency in the ability to respond with certainty to the stimuli with certain learned responses. A girl who wraps locks must concentrate her attention on one particular object to the exclusion of all others; a girl who inspects locks at the same table must distribute her attention over a number of different elements of the locks. Concentration and distribution of attention are two distinct specific abilities. It was found in one plant that girls changed from one job to the other failed to make good and a psychological analysis of the job explains this failure on the basis of the different specific abilities involved in these jobs. The tests which are being used successfully in industry are those which measure the specific abilities of individuals for particular jobs, and not tests for general intelligence.

The process of developing tests for industry is a long one. It involves, first of all, an analysis of the job from the point of view of the abilities involved in its performance. Such an analysis can only be made by a psychologist. In some cases it can be made by merely observing the worker on the job, but in most cases it is actually necessary for the psychologist

to become a worker, to don the overalls of the machine hand, the gloves of the motorman, the green shade of the clerk if he desires to make an adequate analysis—to understand[1] "the mental action for which he is trying to find tests as measures." The next step is to find or devise tests which, in his opinion, involves in their performance the same specific abilities which are involved in doing the job. For this purpose the psychologist can use, sometimes with only slight modifications many of the tests which are in common use, but it is often necessary for him to construct an entirely new piece of apparatus. Analyzing the job and preparing the test are only preliminary steps in developing the tests for particular jobs. There are two additional steps which must be carried out. In the first place the fact that the test is actually a measure of the abilities which the job requires must be empirically demonstrated. In other words, the tests must be tested. This is generally done by submitting workers who are already employed on the job to the test and finding out whether the more proficient workers actually pass the test with a higher score than the less proficient workers. Sometimes, a number of tests which seem to involve the same ability are given, and these selected which show a high correlation with proficiency in the job. Another and longer but better method is to test all applicants for the job with the tests which have been selected by the first method, to make a record of their scores on the test, and to follow them up after they are employed at specific intervals to determine whether the individuals who made high scores become proficient workers and vice versa. (In this connection, of course, it must be recognized that there are other factors than inability for which an individual is found unsatisfactory in industry, and that the test measures only this, the most important factor in satisfaction.) The other step is to provide quantitative standards for selection. The standards must be in terms of units or of times, and the exact point which employment is advisable must be indicated. Such points, critical levels they are called, can only be established empirically, and as more applicants are tested the standards so established are revised and refined.

It is necessary to recognize that tests which are being used in industry overlook an important feature—temperamental differences between individuals. Two men may have the same specific abilities; both may have equal competency for a particular job, but one may be a willing worker, the other may be an unwilling worker. One may be tempera-

[1] Link. Employment Psychology.

mentally fitted for the job, the other may not. The first may be fond of indoor work, the second of outdoor work. The vocational psychologist has hardly attempted to measure these temperamental differences, largely because little of concrete value has been accomplished in the analysis of mental qualities which are called temperamental. Both for purposes of selection in industry, as well as in vocational guidance, definite devices for measuring temperamental differences will have to be developed before selection can be extremely satisfactory.[2] "It must certainly seem," says Watts in an article in the *British Journal of Psychology,* "that the vocational psychologist will need to take into consideration what has so far been overlooked, the instinctive make-up of the subjects of his experiments, and that in choosing workers for particular tasks he must make sure that their instinctive type is the right one. It would be folly to place the man with strong gregarious tendencies in lighthouse or wireless work, or advise him to go into farming in a new colony, just as it would be unwise to encourage a boy devoid of the acquisitive instinct to set up in business. And it will be agreed that a soldier or a reformer without a considerable spice of pugnacity would be a failure, while it is equally beyond dispute that the statesman and the priest, the doctor and the nurse, the teacher and the shepherd would soon tire of their work if they were not endowed strongly with the tender impulse." The next few years will show whether we shall be able to devise tests for the diagnosis of the relative strength of man's various instinctive qualities. It would be possible to quarrel with Watt's analysis of instinctive qualities, but the essential problem is well stated. In addition to abilities there are motives and purposes in the worker's make-up. There are, as has been popularly stated, "'doers who will' and 'doers who won't' and the 'willer' and the 'wonter' present another problem for quantitative treatment with tests." That judgment of temperament made by observation of facial characteristics, color of hair and other physical features, which is recommended and used by popular vocational counsellors, is unreliable is very apparent to the scientist.

One factor in vocational guidance should be the child's competency for the occupation which he seeks or is being advised to enter. The judgment of the counsellor upon the presence of the competency is as unreliable as the judgment of fitness for a job made by the employment agent in indus-

[2]F. Watts. "The Outlook for Vocational Psychology". *British Jour. of Psychol.,* Jan., 1921.

try. The presence or the absence of such competency can be determined by the use of the same tests which are being used by industry in the selection of its workers. Associations interested in vocational guidance should co-operate with industry and obtain from industrial plants the tests which they are using. Such an association should also undertake an analysis of jobs to determine what constitutes competency for particular jobs and the development of measures of such competency, in the same manner as industry is doing. We have passed the time in vocational guidance when jobs can be defined in terms of such abstract qualities as good, hard, clean, desirable, etc. We have reached the point where an accurate definition and reduction to measurable terms of job competency is absolutely essential.

In the use of tests for vocational guidance it must be recognized, however, that competency for a job, as measured by a test, is only one factor in guidance. It is combined with the child's health, his desires, his temperament, and other conditions to determine final choice of an occupation. The test, however,—the same test that industry uses in the selection of workers for its jobs can be used in the place of the harsher method of trial and failure to weed out those who are definitely incompetent to attain proficiency in vocations which otherwise seem suitable and to point the way to those whose desires are not well defined.

THE PROBLEM OF THE UNSELECTED GROUP IN THE STANDARDIZATION OF TESTS

By S. L. Pressey
Studies from the Psychological Laboratory, Indiana University

I. *The Essential Impossibility of Obtaining an Unselected Group in Work with School Children*

The difficulty of obtaining satisfactory norms or standards for adults for any type of test—of general intelligence, vocational aptitude, or what not—has come to be generally recognized. It is realized that different groups of adults vary astoundingly, in the first place, in the extent to which various selective influences have operated to bring them together in this particular sample. The subtle extent to which environmental influences may also come to have an effect upon a person's performance on such tests is also coming to be appreciated. But it seems to be supposed, by some workers in the field, that school children make material for thorough standardization which may be considered free from the influence of such special factors. If there is one single fact which has surprised the writer, from the study of school surveys made during the past three years, it is the fact that such influences are extremely important and pervasive in the public schools. And he has come to the conclusion that standard groups must be very carefully defined if the standards are to mean what they should for comparative purposes. The purpose of the present paper is to present very briefly a few bits of data illustrative of the way in which "sixth grade norms" from one school system may mean a very different thing from "sixth grade norms" from another, nine year old norms in one school may mean a very different selection of nine-year-olds from the group that would have been gathered under similar circumstances in another school—and so on. The data are, to the writer at least, extremely interesting and involve, he believes, matters of extreme importance.

II. *Age-Grade Distributions and Mental Tests*

As illustrative of two types of school system the two following age-grade distributions are presented (see table I).

The results are the age-grade tabulations obtained from test blanks used in a survey of these two school systems made by the writer and his wife. In this work, the "Primer" scale was given to the children in the first three grades, and the "Cross-out" scale to children in the grades from the fourth through high school.[1] Age tabulations from these blanks thus result in a complete age-grade census of the entire school system at the time when the survey was made. The testing was in each case all done within three days and thus gives a very satisfactory cross-section statement of the situation in these school systems at the time of the examination. System C was examined the last of February, System F about three weeks later, in the middle of March. These age-grade tables are full of interesting facts, only a few of which can be mentioned here.

TABLE I

AGE-GRADE DISTRIBUTIONS

City C.

	1	2	3	4	5	6	7	8	9	10	11	12	Total	
5	2	...	...	...	...	...	..	..	...	..	..	..	2	5
6	60	2	...	...	...	...	..	..	...	..	..	..	62	6
7	60	40	2	...	...	...	..	..	...	..	..	..	102	7
8	34	57	37	2	...	...	..	..	...	..	..	..	130	8
9	9	30	60	35	1	...	..	..	...	..	..	..	135	9
10	1	22	19	58	29	...	..	..	...	..	..	..	129	10
11	...	6	14	41	50	21	1	..	...	..	..	..	133	11
12	...	3	8	29	39	38	25	1	2	..	..	..	145	12
13	...	...	3	9	22	28	29	24	8	..	..	..	123	13
14	...	...	1	4	2	18	28	25	38	3	..	..	119	14
15	...	...	...	...	5	5	4	13	27	15	2	..	71	15
16	...	...	...	...	...	...	1	5	25	25	14	3	73	16
17	...	...	...	...	...	...	..	..	1	12	16	27	56	17
18	...	...	...	...	...	...	1	..	1	1	9	16	28	18
19	...	...	...	...	...	...	..	..	...	..	..	8	8	19
20–21	...	...	...	...	...	...	..	..	...	..	1	3	4	20–21
Total	166	160	144	178	148	110	89	68	102	56	42	57	1320	

City F.

	1	2	3	4	5	6	7	8	9	10	11	12	Total	
5	...	...	...	...	...	...	...	...	..	..	..	..	...	5
6	105	3	...	...	...	...	...	...	..	..	..	..	108	6
7	52	65	...	...	...	...	...	...	..	..	..	..	117	7
8	12	69	74	3	...	...	...	...	..	..	..	..	158	8
9	...	11	58	71	2	...	...	...	..	..	..	..	142	9
10	...	4	22	62	58	3	...	...	..	..	..	..	149	10
11	...	...	...	26	67	61	...	...	..	..	..	..	154	11
12	...	...	...	10	29	66	53	...	..	..	..	..	158	12
13	...	...	1	5	13	40	47	50	..	..	..	..	156	13
14	...	...	1	1	7	16	41	53	36	2	..	..	157	14
15	...	...	...	1	1	2	14	22	35	28	2	..	105	15
16	...	...	...	...	...	...	...	12	8	22	24	1	67	16
17	...	...	...	...	...	...	...	1	1	4	24	18	48	17
18	...	...	...	...	...	...	...	...	1	2	4	11	18	18
19	...	...	...	...	...	...	...	...	..	..	3	3	6	19
Total	169	152	156	179	177	188	155	138	81	58	57	33	1543	

[1] See Cross-out Tests, *Jour. of App. Psychol.*, June, 1919; and A Brief Group Scale for Use in the First Three Grades, *Jour. of Educ. Psychol.*, Sept., 1919.

First of all, the question is as to the comparability of grade norms obtained from these two systems; the grade norms are naturally the first to be worked out, since the data comes in grouped by grade and not by age. The grade distributions given above look roughly similar; but comparison of the median ages for each grade brings out, at once, differences of decided importance. These median ages run as follows:

	1	2	3	4	5	6	7	8	9	10	11	12
City C..	7.35	8.68	9.55	10.90	11.88	12.90	13.64	14.36	15.11	16.40	17.31	17.95
City F..	6.80	8.12	9.06	10.25	11.42	12.45	13.52	14.36	15.13	15.97	17.10	17.86
Diff.....	.55	.56	.49	.65	.46	.45	.12	.00	—.02	.43	.21	.09

These differences expressed in hundredths of a year perhaps do not look very surprising. But when it is realized that the children in the first grade of City C are over six months older than the children in the same grade of City F and that the children in the fourth grade of City F are eight months younger than the City C fourth graders, then one realizes that grade norms from City C and City F are *not* comparable. Just what factors bring about these results it is hard to say. It may be that the children entered school later in the second city. Or they may be held back more in their school progress. But whatever the causes may be, the result is unmistakable; grade for grade the children of City F are about five months older than the children in City C. If one is working with tests of mental endowment the situation is bad enough; allowance must be made throughout for this difference in maturity. If the work is with tests in the school subjects, the situation is almost hopelessly complicated. If the children in the second city be found to test higher, this result might be due either to greater maturity, or greater time in school.

Any differences might in fact be due to selective factors connected with these facts. Close study of the two distributions will show that in the first city the dull children tend to be held in the first three grades. But in the second city the incidence of retardation is between the fourth and fifth grade. And selection for the upper grades is much more severe in the first city. There are practically the same number of children in the first grade of City C as of City F (166 and 169 respectively). But only 41 per cent of this number are in the eighth grade in the first city compared with 62 per cent in the second city. It might almost be said that the eighth grade children in the first city were twice as highly selected.

When norms are said to be for the eighth grade, then, in order to have the nature of the group classified, the median

age of the grade should be known, the amount of elimination and retardation—in fact, the total age-grade distribution for the school. In one way or another the total policy of the school system has managed to express itself to an extraordinary extent in merely the crude fact of the age-grade relationship.

So much for grade norms; in dealing with age norms the situation is much more complex. The writer would like to consider particularly the problem of standardization as it appears in work with any one of the group scales for work with the upper grades now available. Such scales involve the ability to read, and so are not very satisfactory in work below the fourth grade. The question is then as to whether satisfactory norms can be obtained by age if children only above the third grade are examined. It is also interesting to consider the influence upon the norms of the admission of high school. In the distributions already referred to a break is made between the third and fourth grade and between the eighth and ninth in order to set off the grade school group most naturally dealt with in work with such scales. A glance at the distribution for City C will reveal the extraordinary fact that if only the children from the fourth through the eighth grade had been examined, it would have been impossible to obtain complete age distributions for *any* single age. Only for ages 12 and 13 would a complete distribution be approximated. Even if we include the third grade we do not manage to include all the cases of any one age. And to present a series of age norms based on data thus obtained approaches rank absurdity. Such norms are warped and twisted out of all shape by these selective influences in the school system.

In City F there is a somewhat better situation. By including the third grade all the 11, 12, and 13 year old children would have been examined. But it is obvious that age norms obtained from this city would not mean at all the same thing as age norms thus obtained from City C. And there is a further factor here of great interest. In City F practically all the fourteen year old children are still in school; there are 158 12 year olds in the system and 157 14 year olds. But in City C there are 145 12 year olds to 114 14 year olds. This elimination had begun to show, in fact, even at thirteen; there are about twenty less 13 year olds in City C than we would expect. Comparable age norms from the two cities would seem, if a scale simply for the upper grades is used, an utter impossibility. It is also interesting to notice that

age at entering school apparently varies, and that the lower ends of the distributions are also different. Thus the first city shows only half the expected number of six year olds in the school, where the second city shows 75 per cent. The situation seems hopelessly special, and the obtaining of a general standard next to impossible.

It is especially interesting to consider in this connection that it is altogether impossible, from work in the schools, to obtain any unselected adolescent norms. It is perfectly obvious that the children 15, 16 and 17 years old who are in school are simply a fraction of the total number of children of these ages. How much they have been selected it is hard to say. The comparative numbers for these ages for the two cities mentioned are by no means so different as are often found. Thus the number of the 16 year olds still in school is 51 per cent of the 12 year olds in City C. But in a third system examined at almost the same time, there were 73 per cent of the expected number of 16 year olds in the public schools. This lack of norms for adolescence is of decided importance. The army psychological work did not, of course, test this group. And the fundamental fact is that we simply don't know anything about what performance we should expect of our delinquent girls, juvenile offenders, or the large and perplexing group of adolescents just going to work.[2]

III. *The Age-Grade Description of Standard Groups*

In the light of such data it at once becomes obvious that in presenting norms for any type of test some statement of both age and grade grouping should be included. There are,

[2] It need hardly be said that the results from a single school must—if results from an entire school system are unsatisfactory—be largely out of the question as a basis for standardization. A town or city is more or less of a sociological unit. In such a total community a proportionate representation of all classes may be expected. But a single school may draw largely from a neighborhood made up almost altogether from one class of people; one school may contain almost altogether the children of day laborers, another be in an excellent residence district. As an example, selected almost at random, schools X and Y in a small Indiana city may be instanced. The median ages for the third, fourth, and fifth grades run 9.07, 9.55, and 11.00 for the first school and 8.06, 9.28, and 10.55 for the second. The first school has 32 in the third grade as compared with only 18 in the fifth; the second has 62 pupils in the third and 87 in the fifth. On the basis of such data both age and grade comparisons seem, at first thought at least, utterly impossible if anything more than school selection is being investigated. (See also "A Comparison of Two Cities and Their School Systems by Means of a Group Scale of Intelligence" Educational Administration and Supervision, Vol. 5, 1919, pp. 53-62.)

of course, a number of ways in which this may be done. The thoroughly scientific way would be to present the age-grade distribution; but a summary statement of the age-grade situation would still be needed. It is becoming a somewhat common practice in work with educational tests to give at least the time of the year when the tests were given. There is some effort now to obtain the age norms for these tests in the various school subjects. The writer cannot see how, in view of the various facts which have just been presented, this can be done very satisfactorily. Tests in the various school subjects are rarely applicable over a wide range of ages or grades; under such circumstances the obtaining of age norms which are reasonably free from the influence of grade selection would seem altogether impossible. The writer would like to make the following suggestions.

(1) In work with tests of general ability grade norms should be invariably accompanied by the median age, for each grade, of the standard group from which the norms are obtained. Time of examining in the school year is relatively unimportant. A statement of the median age will permit allowance for examining at different times of year, and allowances also for differences in amount of retardation and acceleration. It is probably the best single statement of the age-grade situation.[3] In dealing with tests in the school subjects or influenced by the school training, both median age and time of examinaiton should be given.

(2) In developing age norms either tests should be given to the entire school system, or a census of the entire system, at time of examination, should be taken. The number of cases at each age outside of the group examined should be determined and allowed for in the norms so far as possible; such cases may be counted in at the top and bottom of the distribution if the number of such cases is small enough to make such procedure safe. In determining whether the entire population at a given age is included, age 12 is probably the best reference point. Twelve year olds are very rarely found in

[3] Statement in terms of per cent of retardation is, after all, a very clumsy statistical method. It requires in the first place reference to a standard time of the school year; September 1st is usually taken. And it, of course, requires that the census be taken at some other standard time of the year. Limits and standards of retardation and acceleration differ, normality may be granted only to children within a range varying from six months to three years. After all the central tendency is the important matter, but it is dealt with in terms of number at one extreme. Why not simply median age and either inter-quartile range, ten and ninety percentiles, or something like that? The whole situation might be clarified by some such method.

high school, are usually not yet eliminated; and it may be considered reasonably sure that all the twelve year olds have already entered school, and that most of them have progressed far enough to be dealt with by the usual test. If possible, it is highly desirable that a test be given to the first three grades. Otherwise a perspective on the entire situation cannot be gained.

(3) In developing norms for either age or grade, recognition must be taken of the fact that different schools and neighborhoods differ markedly in age-grade distributions, in the ability of the children, and in a variety of other ways. Differences from school to school are likely to be much more striking than differences from one community to another, since segregation of different social classes in different districts of each community is frequent, but entire communities contain representatives of all classes. Standardization on the basis of entire small school systems is, therefore, much more satisfactory than standardization from the same number of children in two or three schools of a large city. In the latter case it is impossible to determine the influence of sociological selection upon the norms.

(4) Our knowledge of standard performance is most woefully lacking for the adolescent group from fourteen on. In the present state of knowledge it is probably best not to attempt any standard norms, but simply to develop norms for school children, for working children, and so on. The greatest single need to-day in the field of mental tests is, perhaps, for the adequate determination of the total distribution of ability in adolescence.

Summary

The paper deals with the problem of obtaining unselected, representative, groups of cases for the determination of norms on the various types of tests. It is shown that

1. Grade norms are highly unreliable because of differences in amount of over-ageness, elimination, and age at starting to school, from one school and one school system to another.

2. Unselected age groups are extremely difficult to obtain since (a) children of a given age may be found scattered over as much as eight grades, and (b) the exact nature of this grade distribution varies from school to school and community to community.

3. It is pointed out that no satisfactory norms are available for ages above fourteen and that elimination from school, at these ages, varies markedly from one school to another.

4. It is suggested that (a) in presenting grade norms median age per grade be invariably given, (b) in presenting age norms a complete age-grade census of the entire school or system should be obtained. The need for careful selection of groups for standardization, and the present inadequate knowledge of adolescent performance on mental tests, is also pointed out.

MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF INDIANA UNIVERSITY

VIII. A Preliminary Investigation of General Prognosis—i. e., "General Intelligence"

By S. L. Pressey

1. *Problem and Materials.* The present study could have been much better made in connection with some investigation in the field of business psychology; the greater variety and the more specific nature of the abilities required in any business concern, and the definite monetary criteria, would have made the analysis much more valuable. As it is, the materials used have to do with the public schools simply because these data were most available. The method was worked out, in the first place, with the notion that it might prove of value in personnel work. In a previous paper in this Journal[1] data regarding the efficiency of a group scale of intelligence, in prognosticating failure and success in Junior High School, were presented. In the discussion regarding this material it was suggested that extended investigation regarding the specificity of prognosis problems was much needed. That is, for the purpose of foretelling success or failure, in the endeavor to more closely co-ordinate work and ability, it is quite conceivable that different tests and methods may be necessary for long and for short time prognosis, or for prognosis in this or that line of work. It was urged that only by such investigations could a decision be reached regarding the validity of the "theory of general intelligence—that is, the theory that prognosis problems can be generalized." The present brief study is, first of all, a preliminary essay at investigation of this problem; it is, in the second place, an attempt to relate, in a very concrete and direct fashion, test score and practical criteria.

The data consist of (a) the scores made two years ago by the children in a sixth grade Junior High School class, on a group scale of intelligence previously described in this Journal[2] and (b) the marks received by these same children at the end of the seventh grade, a year and a half later. A total of 115 children of this class took the examination and also had the complete school records required by the problem. And the very fundamental question is this: Can success and failure be foretold "in general" (so to speak) by the scale; or, are different tests needed according as one is trying to foretell success in different subjects? As subjects largely contrasted, in content, interest, and type of function which seems to be involved, arithmetic and English have been chosen for study.

2. *Results.* It was desired to relate the tests and the criterion in as practical, and as concrete and intimate a fashion as possible. Under

[1] December, 1919.

[2] Pressey, S. L. and L. W. A Group Point Scale for Measuring General Intelligence, *J. of Appl. Psychol.*, Vol. II, 1918, pp. 250-269.

the circumstances, a series of correlation coefficients could hardly yield the information desired; it is tardily being realized that a correlation surface may be of an infinite variety of shapes, that for purposes of individual diagnosis summary of such tables in a coefficient may be of comparatively little value—that to many scatter-diagrams a correlations formula is, essentially, inapplicable.[3] It was, therefore, decided that relationship over the entire range of the distributions should not be studied, but only the relationship of the tests to failure —that is, relationship about the passing mark (75). The following table shows, in a simple and direct way, the efficiency of the scale

	Test Score										
	45	50	55	60	65	70	75	80	85	90	95
Failed	..	..	..	..	..	..	..	3	3	3	..
Passed	..	..	1	1	..	..	..	4	2	5	6
Total	..	..	1	1	..	..	..	7	5	8	6

	Test Score—Continued										
	100	105	110	115	120	125	130	135	140	145	Total
Failed	3	3	...	2	4	...	...	1	...	...	22
Passed	9	5	15	19	4	8	4	6	3	1	93
Total	12	8	15	21	8	8	4	7	3	1	115

in marking off those who have failed in two or more subjects. As will be seen, by no means all the failures made poor scores on the scale, and by no means all those who made poor scores failed at this particular time. But in general the failures are to be found at the

[3] See for instance Kornhauser, A. W., Meine, F., and Ruml, Beardsley. Two models showing the interrelation of several significant correlation variables. *Psychological Bulletin*, Vol. XVI., 1919, pp. 230-235. Thurstone, L. L. Tests for College Entrance, *Journal of Educational Psychology*, Vol. X, 1919, pp. 129-42.

With regard to the writer's data it may be said shortly that the distribution of marks was different for each subject; thus the range for arithmetic was very narrow (over half the marks were between 75 and 80), the distributions for English, Spelling, and Geography were bi-modal, Spelling was skewed very markedly to the top and Geography as definitely toward the bottom. Evidently each teacher had her own standards, her own notions as to the proper allotment of marks; the teachers also presumably differed in the care with which they assigned their gradings, and differed also in their ideas as to what, after all, school marks should mean in the way of recognition of ability, reward for effort, hopefulness for a child's future—and so on! But there is one point in the distribution about which a teacher must think seriously, about which she is much less left to her own devices—and that is the passing mark. Most important for the practical purposes of this study—it is the one point with reference to which the school takes practical action. The passing mark—75—is, therefore, taken as the reference point in the statistical work.

lower end of the distribution: in fact, the relationship is perhaps about as close as could be expected, all things considered.

Such a table as the above exhibits, in a very obvious and direct fashion, the relationship between test and school record. But for comparative purposes some way of summarizing such a table in a single index number is evidently necessary. The form of statement finally used was quite as simple and direct as the table from which it was obtained. If (it was argued) the scale had been, in this particular instance, a perfect prognostic instrument then all the failures would have been at the bottom of the distribution of test scores; the scale would have been 100% differential. As a matter of fact only 9 of the 22 failures are among the 22 who score lowest on the tests. That is, 9 out of the 22, or 41%, are "where they ought to be;" the scale is about 40% efficient, for this particular purpose. Such a statement (of "per cent where they ought to be") is easily obtained, is largely independent of the number of failures dealt with, and would seem very well suited for the rough comparisons dealt with in the present paper.[5] And it may be said at once that the remaining data of the paper are presented in terms of these percentages.

The above results will serve to indicate something as to the prognostic efficiency of the scale "in general"—that is, the efficiency in forecasting those who will fail in *any* two subjects. But the writer was interested rather in efficiency along specific lines, in prognosticating failure in particular subjects. The failures in English (19 in all), and in arithmetic (22 in all) were, therefore, tabulated in the same fashion, and similar per cents of efficiency found. It appeared that the scale was 37% efficient so far as English was concerned, and 22% efficient in setting off failures in arithmetic.

However, for adequate details not only failures in each subject, but results on each test, should be considered. The following table shows the per cent of efficiency of each test, in differentiating failures in English, and in Arithmetic.

	Test									
	1	2	3	4	5	6	7	8	9	10
English.....	5	31	26	11	21	26	16	37	37	26
Arithmetic.....	21	18	29	36	21	32	14	21	29	29

[4] The complexity of the factors influencing a child's school record at a particular time must be constantly kept in mind. Thus of the 19 cases who passed, but who scored below 100 points on the scale (the 25 percentile) 7 had failed of promotion during the previous year, and were progressing now only because they had recently repeated some of their school work. Two of those who failed, but who made a good score on the tests, are definitely known to have failed because of poor health. But, in general, there is a positive relationship between test and school success and failure.

[5] In comparing differential efficiency for different subjects the total distribution of test scores was first tabulated, once for all, from the card records. It was then only necessary, in studying each subject in turn, to retabulate only the scores of those failing. By marking in the failures with red pencil so that they stood out clearly—and by keeping the slide-rule handy—the whole method was extremely easy. Research "sketching" one might call it.

Apparently (if we may trust this table) the tests differ distinctly in their ability to prognosticate success in these two subjects. And the practical question at once arises as to whether, by judicious selection among these tests, a shorter scale, or "differential unit," more efficient than the entire scale, might not be obtained. To make trial of the matter the four tests most differential, for each subject, were selected, on the basis of the above table, and the tabulations from which it was derived.[6] And the scores made on these four tests by each child were added together, and the sums tabulated after exactly the same fashion as were the total scores on the entire examination. Thus the four most differential tests for failure in English were 2, 3, 8, and 9.[7] And Floyd T. made scores on these four tests of 8, 4, 8, and 11 points; his score on the English sub-scale was, then, 31 points. The tabulation showed this sub-scale to have a prognostic efficiency of 47%, as compared with 37% for the entire ten tests of the total examination, in differentiating failure in English. And the arithmetic sub-scale (tests 4, 6, 9, and 10) gave 36% efficiency in differentiating failures in arithmetic, as compared with 22% for the whole scale.

Apparently the tests of the entire scale differ distinctly in their prognostic value. There are, of course, two possible explanations. Either certain tests are efficient for one purpose but not for another; or, certain tests are of relatively slight value for any purpose. As has already appeared, the best tests for dealing with English are by no means the best tests also for differentiating potential failures in mathematics. However, these sub-scales yield further information on this point. The arithmetic sub-scale is 32% differential of failures in English, and the English sub-scale is only 15% differential of failures in arithmetic! That is, there is a reversal; tests may, apparently, be excellent for one purpose and poor for another. In an effort to emphasize this feature a sub-scale demonstrating this was sought. Analysis by test showed tests 2 and 8 to be differential for English while poor for arithmetic, and tests 1 and 4 to be efficient for arithmetic but poor for English. A sub-scale made by combining tests 1 and 4 gave 11% differential efficiency for English and 29%

[6] Where tests were tied for fourth place, as is the case with tests 3, 6 and 10 for English, and tests 9 and 10 for arithmetic, choice was settled by inspection of the original tabulations.

[7] The nature of the tests is unimportant for the present discussion; the point is only that tests appear to differ in their efficiency for different purposes—that the prognostic problems dealt with are, to a certain extent at least, specific problems. For a detailed description of the tests the reader is referred to the original article presenting the scale (see note 2). It may be said briefly that test 2 is "Logical Selection" (the blank presents such lists as "CHAIR—legs, rockers cushion, seat," and the children are told to underline the two things a chair is never without); test 3 is made up of problems in practical arithmetic (mostly making change); test 8 is "Disarranged Sentences;" test 9 is "Practical Information." The four tests of the arithmetic group (4, 6, 9, and 10) are opposites, "Word Completion," "Practical Information," and analogies. There is little or no "superficial relevancy," in the tests of these two groups, to English and arithmetic; but the writer does not believe that such relevancy is particularly important or to be expected. The three tests which appear of relatively little prognostic value with reference to either subject are the two memory tests and "Moral Discrimination."

for arithmetic. And a sub-scale composed of tests 2 and 8 gave 38% for English—and 7% for arithmetic. That is, there is a distinct reversal.

Such a result, if it may be considered reasonably reliable,[8] is surely important enough. It would indicate that prognosis problems were specific, not general. In so far as this may be true different tests and methods must be necessary for different problems. Tests of "general intelligence" can not, in such an event, be used if the most exact determination of ability (that is, the most exact prognosis) is desired; ability in English and ability in arithmetic, clerical ability and mechanical ability—each problem must be dealt with independently, and specifically studied. The point of view suggested is fundamentally different from that habitual at present; instead of dealing with specific problems on the basis of certain generalizations—dealing with them "in general"—each problem must be considered by itself, without any pre-suppositions. In attempting to prognosticate ability in mathematics, in stenography, in salesmanship, one may go through the process of considering whether "general intelligence" or a "special ability" is the important factor, may try certain tests for measuring "intelligence," and in proportion as they deal efficiently with the problem declare that "intelligence" is a factor. Why not ask instead simply the one practical and direct question "What tests will deal most efficiently with this particular problem?" And consideration as to whether "general intelligence" or this or that specific ability is involved appears largely unimportant, and in the realm of the theoretical and academic.

It is such a point of view that these results suggest. And it is a point of view that is, if one is empirically minded, very stimulating.

3. *Discussion.* Certainly the results are not such as to warrant any conclusion in the matter! But it should be kept in mind, in considering the great mass of experimentation, observation, and theory which forms the basis for current ideas regarding the dominant importance of "general intelligence," that there are certain constant errors which operate greatly to increase the apparent importance of the "common factor" In spite of the best intentions, judges tend to overestimate the similarity of an individual's abilities along different lines.[9] In spite of the best efforts of the test builders, it is still hardly possible to "test" much besides various types of controlled association of the verbal type, with any satisfactoriness; for any adequate sampling of the total richness of human activities the tests are still pitifully

[8] It is *not* reasonably reliable—of course! Both method and data are painfully inadequate to the importance of the exceedingly fundamental and difficult problem dealt with,—a problem which can hardly, in any case, be "solved," but resolution of which can come only as the result of a multitude of investigations, from a variety of standpoints, and after a period of years. The present study is simply a bit of exploratory research, and trial of methods. But as such it would seem of some interest, and suggestive value. The writer has a notion that in dealing with such large and extensive problems, a large number of such smaller studies, attacking from many angles—a campaign of attrition one might call it—are likely to be much more fruitful than a few elaborate and laborious investigations.

[9] See Thorndike, E. L. A Constant Error in Psychological Ratings. *Journal of Applied Psychology*, Vol. 4, 1920, pp. 25-29; also Kelley, T. L. Educational Guidance. Teachers College, 1916.

inadequate. High interrelation between tests can hardly, then, be used as evidence for close correlation between all types of ability. In spite of the great broadening of the public school curriculum in recent years, progress in school is still conditioned almost wholly by ability in the academic, bookish subjects; "general" ability, as it appears in school may be simply the functioning, with different materials, of a relatively special ability. It should also be pointed out that, while it may be convenient for practical purposes to sum the results of a series of tests into a single rating, to average school marks, or employers estimates, or otherwise develop synthetic statements as to an individual's ability, such investigations are likely to yield just what is put in by the procedure—certain vague general facts, which may very well obscure the concrete, specific details we are most in need of. The general factor may be the all-important factor. But we are surely as yet in no position to be dogmatic about it. Practical considerations may make it advisable to proceed upon that hypothesis. Meanwhile, critical investigation of the concept of "general intelligence" is surely much needed. It is as a bit of suggestive research along such lines that the present paper is intended.

A word remains to be said regarding the method which was employed, for relating tests and school record. It has obvious faults—faults so obvious that they hardly need mention.[10] It is simply an effort, in keeping with the fundamental idea of the study, to deal with things in the very most concrete and specific manner possible. The particular method is of little importance. But methods of this sort, which permit study of relationships in a very simple, direct, and specific way, would seem capable of rendering distinct service in dealing with many problems of applied psychology.

Summary

The paper deals with the scores made by a large Junior High School class, on certain tests of intelligence, and with the marks obtained by these children over a year later. The question is as to the relative merits of these tests, in foretelling what marks these children would receive. It was found that:

(1) The tests differed distinctly in their prognostic efficiency. By careful selection and combination four tests were found which were more efficient than the entire ten tests of the examination used, for the purposes studied.

(2) Certain tests appeared very efficient for certain purposes, but poor for other purposes. The four-test differential units showed this same specific efficiency; different tests appeared to be required for foretelling failure in arithmetic, and English. Certain groups of tests exhibiting this specific prognosis to a more marked degree were also found.

It is urged that investigation regarding the specificity of prognosis problems is much needed.

[10] It is, particularly, a method which calls for a much larger number of cases, if the findings are to be reliable. It is the writer's judgment, from trial of the method in a variety of ways and on a variety of data, that it is more reliable than might be supposed. However, as an example of an analogous method yielding a more stable result see Pressey, S. L., The Practical "Efficiency" of a Group Scale of Intelligence, *Journal of Applied Psychology*, Vol. III, 1919, pp. 68-80, or "Suggestions regarding Professor Thurstone's 'Method of Critical Scores,'" *Journal of Educational Psychology*, December, 1919.

MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF INDIANA UNIVERSITY

IX. Further Data with Regard to Sex Differences

By S. L. Pressey and L. W. Pressey

I. *Problem and Materials.* In a previous paper[1] by one of the writers, data were presented with regard to sex differences in central tendency and variability, as they appeared on a scale of general intelligence. It was concluded that (1) the girls showed a very slight, though constant, superiority in central tendency when score on the entire examination was considered; on the individual tests they showed superiority in controlled association and memory—on 8 out of the 10 tests. The boys showed a marked superiority in arithmetic and were slightly better than the girls in general information. (2) The boys showed a slightly greater range—which was also constant for all reliable ages. Analysis by test showed a similarly greater range for the boys on seven of the ten tests; three tests showed little difference, but in no case was there greater variability among the girls. The present paper reports briefly certain further data with regard to sex differences on various types of examination.

Three groups of data are dealt with: (a) Results from 1,408 children 6, 7 and 8 years of age, tested with the Primer Scale.[2] (b) Results from 787 children 12 and 13 years of age, tested with the Cross-Out Tests.[3] (c) Results from 101 college students, tested with a series of tests intended for the "investigation of the emotions."[4] The reports on these three sets of data will be taken up in order.

II. *Results.* (a) The Primer Scale has been described in full elsewhere; in this connection it need only be said that it is a brief group scale for measuring general intelligence, consisting of four tests not involving ability to read or write, for use with children in the first

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[1] Pressey, L. W. "Sex Differences Shown by 2,544 School Children on a Group Scale of Intelligence, with Special Reference to Variability." *Journal of Applied Psychology,* Vol. 2, 1918, pp. 323-340.

[2] Pressey, L. W. "A Brief Group Scale of Intelligence for Use in the first Three Grades." *Journal of Educational Psychology,* Vol. 10, 1919, pp. 297-308.

[3] Pressey, S. L. "A Brief Group Scale of Intelligence for Use in School Surveys." *Journal of Educational Psychology,* Vol. 11, 1920, pp. 89-100.

[4] Pressey, S. L., and Chambers O. R. "First Revision of a Group Scale Designed for Investigating the Emotions. *Journal of Applied Psychology,* Vol. 4, 1920, pp. 97-104.

three grades.[5] In recent surveys all the children in the first three grades of five cities have been examined—a total of 1,408 cases of which 698 were boys and 710 were girls. The results for 7 and 8 have been tabulated by sex. The six year group had to be dropped from the study because three of the five cities had yearly promotions only; the result was that in these three cities only about 60% of the six year olds were in school at the time of the surveys, and of these a majority were boys—the tendency seeming to be to keep the girls out of school and at home somewhat longer. A somewhat analogous difficulty was encountered in obtaining an unselected eight year old group; there were some children of this age who were in the fourth grade, and so not tested with this scale. However, there were only a few of these cases (8 in all, 7 boys and 1 girl) in the five cities taken together. And since there were so few accelerates, it seemed safe to assume that only the very brightest children received double promotions; these 8 children have, therefore, been counted in as above the 90 percentile for their age. With this interpolation, the data for ages seven and eight would seem fairly satisfactory.

The results, as regards central tendency, may be summarized very shortly. The girls show a slight superiority; of the children who compose the upper half of the entire distribution for these two ages, 53% are girls and 47% boys. Findings as regards variability seem to indicate a greater range for the boys. Two methods were used. The first method required simply the examination of the highest and lowest 10, 3 and 1 per cents of the entire distributions to determine the composition of the extremes as regards sex. The results appear below; the two ages have been combined and the numbers thrown into per cent. It will be seen that the boys predominate in the extremes; and the further out into the extremes the investigation is carried the more the boys are in the majority.

TABLE I

	B.	G.		B.	G.
Highest 10 per cent....	51	49	Lowest 10 per cent..	55	45
Highest 3 per cent....	81	19	Lowest 3 per cent..	69	31
Highest 1 per cent....	100	0	Lowest 1 per cent..	100	0

[5] See reference note 2 above, or Pressey, S. L. and L. W. "Cross-out Tests, with Suggestions as to a Group Scale of the Emotions," *Journal of Applied Psychology*, Vol. 3, 1919, pp. 138-150. The first test consists of groups of dots, each group of dots making a pattern; there is, however, one dot in each group which is outside of or spoils the pattern—this dot the children are to cross out. The second test is made up of squares, each square containing two objects which are similar, in some important way, and one object which is different from the other two; this different thing the children are to cross out. The third test shows at the top of the page four forms—a triangle, a square, a cross, and a circle. Below are squares or "boxes" containing "blocks" which are to be fitted into the four places at the top of the page; but in each "box" there is one piece which will not fit in—and this extra piece is to be crossed out. The last test shows pictures in each of which there is something wrong—this wrong part is to be crossed out.

The second method for investigating variability was even more simple. It consisted of simply examining the distributions of scores for each one of the five cities separately for ages seven and eight, in order to determine whether, in each distribution, a boy or a girl scored highest and lowest. There were, thus, ten cases of highest score (one for each of the two ages in each of the five cities) and a similar number of lowest scores. Of the 10 highest cases, every one was a boy; there was not a single girl at either age in any one of the five cities who made the highest score for her age. Of the 10 lowest cases, 6 were boys and 4 were girls.

(b) Results from three cities where complete surveys were made were included in the consideration of sex differences found with the Cross-Out Tests. After very careful consideration it was decided to limit the study to ages twelve and thirteen; because of the influence of school selection it was impossible to obtain reasonably unselected groups for any other age. As it was, a few of the twelve-year-olds and one or two of the thirteen-year-olds were still in the first three grades, where the test could not be given on account of literacy (over 10% of the eleven-year-olds were in the first three grades, while many of the fourteen-year children had left school). Since the tests included the High School, the upper ends of the twelve and thirteen year distributions were tested. So the only children of these ages who were missed were 8 retards below the fourth grade (six boys and two girls); these have been counted in as being in the lowest three per cent for their age. Of the total 787 cases, 387 were boys and 400 were girls.

The results as regards differences in central tendency agree with those found with the Primer Scale. Taking all three cities together, there were 46% boys and 54% girls scoring in the upper half of the distributions. In City A the upper half of the distribution was composed of 45% boys; in City B, 47% boys; and in City C, 47% boys.

The findings as regards variability are, however, very indeterminate. Again, the highest and lowest 10, 3 and 1 percents of the entire distributions were examined in order to determine the composition of these extremes as regards sex. The results are given below; again the two ages have been combined and the figures thrown into percents.

TABLE II

	B.	G.
Highest 10 per cent	48	52
Highest 3 per cent	43	57
Highest 1 per cent	50	50
Lowest 10 per cent	60	40
Lowest 3 per cent	67	33
Lowest 1 per cent (not all of the eight children below the 4th grade would score in the lowest 1%; therefore it could not be reckoned.)		

The width of the distributions for the two sexes is about the same; the table indicates little except the effect that would be expected in the extremes from the fact that the girls' central tendency is higher.[6]

[6] The scores from two of these three cities were analysed by test. The results are by no means consistent from one city to the other. Two facts, however, stand out rather sharply. On the first test, for both cities, the girls show a wider range; of the children scoring in the highest 10 per cent, 56% in City A and 63% in City B are

(c) A group of five tests "designed for the investigation of the emotions" has already been described in a previous number of this JOURNAL. (See Note 4.) Results from 101 college students, 52 girls and 49 men (students in a course in Abnormal Psychology and a course in Domestic Science, for the most part Juniors and Seniors), were analyzed by sex[7] and may be summarized briefly.

Test 1 consists of five lists, each of five words; these words are, for the most part, of emotional content,—such words as tremble, street-walker, rival, ugly, insult. The subjects were told to read through the lists and cross out *everything* that was unpleasant to them. It was found that 55% of the girls crossed out more words than the median boy. The subjects were then told to go through the lists again and draw a line around the *most* unpleasant word in each list. In scoring these responses, the word chosen as most unpleasant by the greatest number was considered the modal word for that list, and the score of each person consisted of the number of lines in which he chose some other than the modal word as most unpleasant—that is, the number of times he deviated from the modal choice of the group. (In some lines the men considered one word as most unpleasant while the girls chose another; on these cases both words were considered modal). It was found that 90% of the girls deviated more than did the median man.[8]

In another test, in which the subjects were required to read through 25 lists of moral terms (such as insulting, quarreling, mislead, hurting, carefulness), and cross out the worst thing in each list, 22% of the girls deviated from the modal choice more than the median man. Similarly, in going through the same lists again and selecting the most common sin, 26% of the girls deviated more than the median man.

In a third test, in which the subjects were required to read through 25 lists such as FOOT—leaf, stocking, tennis, spider, kick, and cross out the word in small letters most closely connected in their mind with

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girls; of those scoring in the lowest 10 per cent, 69% in City A and 63% in City B are girls. The other fact is a similarly greater range for the boys on the third test. Of those scoring in the highest 10 per cent, 59% in City A and 67% in City B were boys; of those in the lowest 10 per cent, 56% in City A and 58% in City B were boys. It should be said at once, however, with regard to this last result, that on a test somewhat similar to this (another arithmetic test) used in the previous study referred to in Note 1, the range for the boys and the girls was identical, although the central tendencies were, in both cases, higher for the boys. Test 1, it should be mentioned, is a form of Disarranged Sentences; Test II is a test of practical information; Test III is a form of number progression; and Test IV essentially a vocabulary test. On tests two and four there appeared to be little difference in variability, or in central tendency.

[7] The tabulations were made by Mr. O. R. Chambers, to whom the writers wish to express their obligations.

[8] It should also be mentioned that the words of the test were divided into four classes according as they were unpleasant because they appealed to fear, disgust, sex or self-feeling. Half again more sex words were selected by the girls than by the men as most unpleasant, while half again more boys than girls selected the self-feeling words as most unpleasant. The men exceeded the women in the selection of fear words.

the word in capitals at the beginning of the list, only 27% of the girls showed idiosyncrasy greater than the median man.

These results are, of course, from only a few selected, adult cases, and are results on only three tests.[9] They are included in this report because of certain important bearings such findings have, the writers believe, upon the interpretation of results obtained with tests of intelligence.

3. *Discussion.* The above materials surely make up an odd collection of results, from which it would hardly seem possible to draw any very definite conclusions! It seems fairly clear that on the usual scale for measuring "general intelligence" girls average slightly better than boys. The differences are, however, so slight as to be essentially negligible from any practical point of view. In fact, the slight superiority of the girls may very well be due simply to a preponderance of tests of a literary nature, in such scales, as they are usually made up. The boys show superiority on other types of tests—as has well been demonstrated by use of the army tests in the universities. In fact, the writers would be willing to contract to build a group scale of "intelligence" in which the boys would excell. Or, perhaps the fundamental fact in this superiority of the girls is dependent in part upon a greater docility or upon a relatively greater interest in indoor tasks. Or, the difference may be connected with differences in physiological growth rate—one might enumerate almost any number of possible causes, but surely with no great profit. The one fundamental and all-important fact about these differences in central tendency is, as Thorndike says,[10] "their small amount."

As regards variability the situation is much more complex. The findings obtained by the Primer Scale are essentially in accordance with the results obtained previously by one of the writers (see note 1). The findings with the cross-out tests fail to support these conclusions. It may be that the more narrow distribution of scores given by these tests does not give room for the differences to show themselves. There is no good reason that the writers can see, however, for supposing this; the amount of it is that the total findings are not consistent with each other. Certain considerations with regard to what positive findings there are, indicative of greater variability among the boys, remain, however, to be mentioned.

It should be pointed out, first of all, that the positive findings, even if they be accepted at their face value as indicative of fundamental greater variability in mental calibre among boys and men, do not indicate differences in variability sufficient to warrant any practical action in educational policy, in business, politics, or elsewhere. It should also be made clear that the differences between the most brilliant boy and the most brilliant girl are so slight as to make it altogether unwarrantable in particular instances to discriminate toward or against either sex. The positive findings, even with the most that can be made of them, have no more than a theoretical and general interest.

But there are a number of other entirely plausible explanations which can be given for the positive findings as regards variability—explanations which do not presuppose any difference in the distribution of intelligence. Three such explanations seem to the writers particularly worth mention.

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[9] Two other tests were given (see the original paper, note 4) but the results yielded were of doubtful reliability.

[10] Thorndike, *Educational Psychology*, Vol. 3, 1914.

(a) It has already been pointed out that the higher average of the girls, in total score on the scales used, may be due simply to the nature of the tests making up these scales—to a more or less chance of selection of tests on which the girls did better; and the writers have ventured the assertion that it would be entirely possible to formulate a scale showing a similar slight superiority for the boys. There is a little evidence to suggest that, in analogous fashion, comparative variability may be conditioned by the nature of the tests (as with tests I and III of the Cross-out Scale).

(b) It must also be emphasized that selective influences, of an extremely subtle and pervasive kind, operate to make it exceedingly difficult to obtain sex groups so thoroughly unselected as to make suitable material for the study of nice differences in variability. The difficulties in this connection encountered in the present study may serve as illustration.[11] The possible importance of differences in age of entering remains, however, to be pointed out. In certain of the systems examined the difference was marked; thus in City G, there were 63 boys six years of age and only 46 girls. If we may suppose that the boys, as a result of circumstances, tend to enter school earlier, but for the most part drop back; and if we may suppose the tests to a slight degree affected by school training, we evidently have a very pretty explanation for greater variability on the part of the boys. They have been in school longer, the brightest boys are further along than the brightest girls; but, for the most part, they are less developed, or less interested in school work, and the dullest ones soon drop behind the dullest girls. This explanation is, the writers feel, of some little interest.

(c) It should, finally, be emphasized that there are very marked differences between the sexes in emotional attitudes and interests—differences which are the most marked findings in previous studies, and which have received interesting confirmation in the emotional test data just presented. Such differences may be the result of differences in instinctive equipment. They are surely also, in no small part, due to social influences. It would seem not at all unlikely that such factors might have their influence upon results yielded by tests of "intelligence." Whether they could operate to affect variability may be a question; but several ways are conceivable in which they might bring about such a result. In considering any differences between the sexes, emotional elements would seem deserving of first consideration.

Well—surely no very definite conclusions are possible! In fact, the writers have come to feel that the test instruments are hardly at present developed to the nicety required for satisfactory study of sex differences, so far at least as variability is concerned. And they have largely lost interest in the problem. They are, in fact, rather inclined to feel that it might be wiser to speak of tests of intelligence as tests of general prognosis, as is suggested in the accompanying study, without attempting to decide as to just what factors may contribute to the prognostic indication. It then at once appears that such tests are hardly suited for investigation of this problem of sex differences in mental endowment.

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[11] See also Pressey, S. L. "The Problem of the Unselected Group in the Standardization of Tests," *Journal of Applied Psychology.*

SUMMARY

The article summarizes certain data with regard to sex differences in mental and emotional traits, as determined by various tests. It was found that:

1. Results with the Primer Scale show a slight superiority in central tendency for the girls and slightly greater range for the boys.
2. Results with the Cross-out Tests show a slightly superior central tendency for girls; the findings with regard to variability are indeterminate.
3. Results with a series of tests "designed for the investigation of the emotions" show definite sex differences among college students in likes and dislikes, moral judgments and emotional associates.
4. It is concluded (a) that such sex differences in intelligence are of no practical importance, (b) that it is hardly possible at present to investigate these differences with any degree of exactness because of the difficulty in calculating the influence of (1) the subject-matter of the test, (2) selective factors, and (3) emotional factors, probably of environmental origin.

A NEW JOURNAL OF PRACTICAL PSYCHOLOGY

And a Translation of Its Introductory Article

By Henry C. Link

In October, 1919, Germany saw the appearance of a new monthly journal devoted to the field of practical psychology. This journal, entitled "Praktische Psychologie," is edited by Dr. W. Moede and Dr. C. Piorkowski (Berlin W. 30, Luitpoldstr. 14). The former is a teacher at the Charlottenburg University and is carrying on extensive experiments with tool apprentices. The contents of the first two numbers of this journal have already been briefly reviewed by the writer in the *Psychological Bulletin* for October.

In introducing this journal, the editors say in part:

"Praktische Psychologie" is the first monthly paper which is conducted in the interests of the entire field of applied or practical psychology. It will concern itself chiefly with industrial psychology and experimental pedagogy, but also with medical, legal and social psychology as well as with experimental esthetics. The chief emphasis of the publication, however, will be upon Industrial Psychology.

The field of industrial psychology includes in the first place:

"Vocational aptitudes and vocational guidance. The tremendous importance to the new state of this particular subject is indicated by the appropriation for vocational guidance made jointly on March 19, 1919, by the ministry of industry and commerce, the ministry of the interior, of education and of agriculture. Vocational guidance is thereby made a duty of the local community, and the careful consideration of bodily and mental aptitudes is strictly enjoined. We shall discuss impartially all statistical and experimental studies which contribute to the knowledge of the necessary facts regarding a particular vocation."

"A second important aspect of Industrial Psychology is the reorganization along more rational lines of the apprenticeship system and of working methods. These subjects will be thoroughly discussed as a part of Industrial Psychology. Above all we shall here describe the steps by which operations at a machine or at a desk are to be improved in the direction of increased comfort or decreased fatigue.

"In addition to actual operations we shall also thoroughly consider questions of external and internal organization in the light of psychological technique. The most effective methods of instruction will receive our particular attention."

The first article in this new journal is an eloquent exposition of the significance of the new science for the future of Germany. It was thought that American psychologists would be interested in this point of view and in the scope of science as it is here described. For this reason, permission was obtained from Dr. G. Schlessinger, the writer, and from the editors, to translate and publish the article in this country.

Vocational Guidance and Psycho-Technics

Professor Ing G. Schlessinger at Charlottenburg

The most powerful stimulus of the German revolution is the recognition of the fact that the destinies of the world are determined not by matter and its organization, not by force and its application (in these respects the utmost was accomplished during the war) but by the human being in the capacity of manager or executive, leader or subordinate. The exaggerated mechanization of human beings, compulsory labor, the censorship, excessive discipline, led inevitably to rebellion, to the violent breaking of the chains which bound a newly unified people. Man is not a machine. There is no money equivalent for personal sacrifice. Therefore, our workers today are struggling not for higher wages, merely, but for moral values. Above all, they wish to elevate themselves from the degraded level of the fourth class to the level of equal rights and privileges. "We workers wish to share in knowledge (mitwissen) and to cooperate (mitwirken) where practicable, in management. Wages, however, shall be based on accomplishment."

"Granted that the humanity and the personal dignity of man now hold the center of attention, and that man-hours and man-units are no longer to be treated as commodities, the supreme problem before us is to place the best man always in the best position—in the trade school, where the apprentice develops, in industry where laborer and executive are employed, in the development department where machines are invented and prepared for the manufacturer, in the executive department to which the threads of industry lead and in which they must be kept free from entanglements and undue tension. To find the right man and place him in the right position is today more than ever, the supreme problem in our broken down Fatherland, for although raw materials are scarce, leaders are even more scarce.

While we are waiting for a Messiah, some conspicuous leader who will help us out of our deep distress, we cannot remain idle. We must give rein to our old German virtue, "Strenuous and systematic work." We must exert ourselves to find or create the means which will infuse new strength into Germany's mainstay, namely, its powerful Industry. We must cooperate in the laying of that human foundation without which our recovery is impossible.

Enthusiasm and inclination are the conditions of great deeds! But who can work energetically and cheerfully if he has chosen the wrong vocation? Who can help a youth, when he leaves school and lacks a well-based preference for a particular calling—an occurrence which is all too frequent—to find the right path? The father is onesidedly absorbed in his own occupation, with which he himself is frequently dissatisfied. The teacher usually knows only superficially the requirements of the various activities about which he is called upon to advise his pupil. He can advise him only morally and ethically. The physician can, on the basis of a few physical examinations, only inform his patient whether his health and strength will suffice for a particular vocation.

Therefore, we are confronted at this critical point by a gap, which, if not bridged, will have the most serious results on the working effectiveness of the nation.

The choice of vocation and thorough vocational training are bound up with effective and practical vocational guidance. The latter requires experts whose knowledge must be accompanied not only by

honest intentions and a warm heart (who can call himself a vocational counsellor without these?) but by a mastery of the entire technique which enables us to illuminate the mental makeup of the person to be advised. Though many of the mental activities of man are only mechanical, how fallacious it is to rate copying, counting, and figuring higher, mentally, than driving an automobile, cutting a micrometer screw, or filing a fine piece of work. These are only different mental activities. At one kind of work hands remain clean and collars white, but the degree of concentration, the feeling of responsibility are in no way more intense and are only necessary to a greater extent.

The science of management, therefore, rightly gives first emphasis to the proper selection of men. It always begins—if it is to be successful in the central office of an industry, among the so-called brain workers. It appoints these, and not only lays out the plan of operation, but above all designates those who are to execute it. It ends only in the shop with the actual process of manufacturing. Its influence is strongest and most penetrating from the top down rather than in the reverse direction. With a practical man one can talk business. Every word starts a chain of thought, releases a series of experiences, with which it is easy to tie up new ideas. To convince a routine encrusted, academic bookworm of the value of new methods is, as experience tells us, much more difficult because the powerful mental influence which actual work in a shop exerts is missing and must be replaced by abstract education through the spoken word and the use of general concepts.

Therefore, the content of vocational guidance—Psychotechnics—is based for the present, above all things, on the discovery of the mental abilities of the apprentice. A technical procedure is required in order to analyze the inherited tendencies of an individual though not to explore his soul. The word "Psycho" is, to be sure, misleading; our concern is not at all with the "soul" or with morals or ethics, or with a man's will-power; the latter can only be discovered through personal association, and for this the teacher in school is the proper person. From the standpoint of the practical psychologist we are concerned only with the *ostensibly* spiritual. Those objective manifestations which the individual himself can verify and which will offend no man. For instance, whether an arm is strong or weak, an eye far or near-sighted or color-blind; whether the mathematical sense is crippled, the memory weak, or the susceptibility to fatigue marked—these are determinable facts which will never embarrass an individual. We are concerned not with demotion but with proper classification. For the presence of a number of these attributes, partly physical, partly mental, is indispensable to the successful exercise of a particular vocation. The blacksmith needs a strong hand, the locomotive engineer must be able to distinguish colors, the piano tuner must have a musical ear, a librarian a good memory, as must also a writer. The pilot of a boat, an airship, a motorcar, must not become easily exhausted.

The dilettante scientist is therefore unable to study psycho-technics as an abstract science. He must start with a particular vocation, the elementary requirements of which he must carefully gather, sift, and analyze before he can undertake to apply his tests with any chance of success. This preparation the psycho-technical procedure prescribes as indispensable. Then follows the search for apparatus with which to measure these innate qualities, and finally the construction of the

apparatus. The apparatus can be borrowed from the immediate requirements of the vocation itself—for example, a micrometer as a test of the sense of touch; it may, however, be quite independent of such a connection, as, for example, the tremometer for measuring tremor in core-makers, the tachistoscope for street-car motormen, etc. Slowly, but surely, the close cooperation between engineer and business psychologist which has now been achieved is developing a procedure which will apply equally to all vocations, and which will vary only as to the apparatus required by the different occupations. The machine designer and the mason, the automobile driver and telephone operator have more mental activities in common than the superficial observer generally thinks. And yet the entire program of the industrial psychologist is far removed from any attempt to expose the soul, a belief with which ignorant opponents try to frighten the workers.

One who has seen the many hundreds of fourteen to sixteen-year-old apprentices at the Charlottenburg Technical High School, working cheerfully and even enthusiastically in the vocational experiments being conducted there for machine tool and shop management work, a group which Dr. Moede is handling, one who has lived through the tragic circumstances which called attention to the necessity for such experiments, will be convinced that we are on the right track, that we are indeed bridging the gap which has hitherto separated the school life from the vocational calling, and that we will open our accounts on a fresh page when parental home and the school, medicine and industrial psychology, cooperate toward a common end.

Neither science nor experience are the determining factors nor are we primarily concerned with calculations. inventions, or experiments. Our chief concern is the full, unhindered development of inherited qualities, in short, with the really best development of every single being. Only in this fashion can we convert workers, from the manual laborer to the general manager, into skilled workers. And only thus can we attain the high level of humanity from which the longed for leader will finally arise.

BOOK REVIEWS

J. Crosby Chapman. *Trade Tests.* Henry Holt and Company, New York, 1921, p. 435.

As is indicated by its subtitle, this book by Professor Chapman constitutes a manual on "The Scientific Measurement of Trade Proficiency," and answers the general question, "What is a trade test?"

The chapter headings which follow are indicative of the scope and character of the work: The Construction of the Oral Trade Test; Administration and Scope of the Oral Trade Test; The Picture Trade Test Method; The Construction of a Performance Trade Test; The Written Group Test Method; The Analogy between the Army and the Industrial Employment Problem; Problem of Occupational Analysis; What the Trade Test is Not; The Use of the Various Types of Trade Tests; The Adaptation of Trade Test Methods to the Training of Employees; the Installation of Trade Tests; and Some Further Applications of Trade Test Methods.

The reader is led to expect much from so imposing a list of contents, and his anticipations are fully realized in reading the book, for a clear-cut presentation is made of the scientific material collected. This is further supplemented by many illustrations of trade tests, rating scales, diagrams, photographs, etc.

"Trade Tests" are a by-product of the World War. They are the result of extensive scientific research work conducted by the Committee on Classification of Personnel under the direction of the War Department to solve the problem of efficient selection and placement of the army's skilled personnel. In view of the extraordinary success of the trade test instruments in the army, and having in mind the utter inadequacy of the methods employed by industry at large, the author presents the findings as a method which, in a modified form, should be extremely useful to industry in solving its perplexing problem of securing an adequate amount of the indispensable human element in the process of production.

Professor Chapman had a direct part in formulating the trade tests, and he gives a clear and comprehensive statement in this volume of the conditions which gave rise to these tests, he discusses the methods of their construction, their relative merits and demerits, and he suggests their various possible applications to the problems of the industrial world with reference to its personnel. He sees an analogy between the army and the problem of industrial employment, and believes that by adapting these trade tests to the needs of employment bureaus and vestibule schools, industry will get much nearer the solution of its problem.

Under present slack conditions with great masses of workers idly twiddling their thumbs, the idea of introducing a labor saving device appears, to say the least, somewhat ill-timed. One fears that the statement that "depleted man-power is the sad aftermath of war," under present conditions, will be far from conducive to the wide circulation which the book merits. Dr. Chapman evidently considers the present ebb in industry but a temporary condition, and anticipates little diffi-

culty from this direction. He fears that opposition may come from the man for whom the book is primarily designed,—from the employer who has had sad experiences with unqualified individuals who have offered various inadequate solutions in the past, and that he may see in this extremely scientific method but another bogus cure.

The work is written entirely from the viewpoint of the employer's needs, emphasizing the benefits which the trade tests should yield to him; and one is disappointed that the author has not pointed out the advantages that should accrue to the workers and to society in general by the application of these tests.

Veblen has pointed out the fact that the introduction of machinery has reduced everything to standardized units, i.e., not only production processes in industry, but man's working conditions, his living conditions, the goods he consumes, and his very needs. A disturbance anywhere of this standardization means hardships. Since the human element is so important, which the author recognizes, he offers these trade tests as a means of stabilizing this fluctuating human factor.

Labor should be quick to see the advantages it would gain by the extensive use of this method of gradation and selection. It should result in removing round pegs from square holes. Placing a man on the job for which he is fitted by nature, inclination and training, and where he will have opportunity to express himself to the utmost, should strengthen what such students as Parker, Veblen, Tead, and others, include in the general phrase of "instincts of workmanship." The ideal consequences should be greater production for the enterpreneur, advancement and increased pay and contentment for the workman, and a step toward industrial peace for society at large.

The author is looking forward to the day when various scientific methods will be employed by private and public employment bureaus where by means of an adequate examination the man seeking work will be given his trade rating and sent to the right job. He urges the imperative need of a more economical use of industry's great want, man power.

"Trade Tests" is the result of much painstaking effort by such distinguished men as L. E. Thorndike, W. D. Scott, the author, and others. All students of industrial problems will find in this scientific work a distinctly *new method* which, in connection with intelligence tests and skill prediction tests, gives promise of effectively applying psychology still further to the far-reaching problems of our national industrial life. The book cannot be too highly commended. It should receive the widest circulation.

Clark University. G. T. SCHWENNING.

KNIGHT DUNLAP. *"Mystictism, Freudianism and Scientific Psychology."* C. V. Mosby Co., St. Louis, Mo.

This book may readily be classified as being of two parts: destructive and constructive. Professor Dunlap has little use for Mysticism and Freudianism, so the first two chapters on these subjects are destructive in nature, while the third chapter or constructive part deals with the foundations of Scientific Psychology.

Taking each term separately, the author devotes a chapter to each in a clean-cut description. Mysticism is defined as a belief in a third kind of knowledge which ranks higher in value than either of the other two. There are a number of conventional names, all of which are admitted to be metaphorical, for the act or fact of knowing in this assumed third way. Three terms especially have been employed to

designate this act: "union," which emphasizes the fundamental characteristic that the subject who knows and object which is known become the same by one being absorbed into the other; "love," that which attracts and binds together; and "ecstacy," which alludes to the same alleged fact of the knowing subject losing its identity in the known object. After discussing the origins of the European Mysticism, Quasi-Mysticism and Pseudo-Mysticism, Professor Dunlap has this to say in the closing of the chapter: "In freeing itself from the arms and methods of science, Mysticism adopts without scruple a type of reasoning against which science constantly struggles, the type known to the logicians as the fallacy of the ambiguous middle term or the 'sliding term.'"

The second chapter discusses Freudianism and the psychoanalysists, giving the origin, program and claims of psychoanalysis, and setting forth the essential postulate of the "subconscious mind." The most important ideas or furniture of the mind are "desires," the most important being sex desire which is assumed by Freudians to commence in the early weeks of infancy as autoerotism. This hypothesis of infantile sex life is founded on the specific fallacy of "secundum quid." The final consequence of this method is to define sex as the whole universe, which would necessitate the derivation of a new term for what is ordinarily considered sexual. Freudianism, like Mysticism, is also unscientific divulging into the fallacy of the ambiguous middle term and venturing into a realm resembling that of the third kind of knowledge of Mysticism.

Anything to be scientific must be, like Scientific Psychology, founded upon certain scientific procedure. Science must start from an empirial basis of the facts of experience; must form, according to the law of parsimony, a working hypothesis, subject to experimental investigation, into which the observed facts must fit; and must pay extreme care to significance of terms. Such principles readily exclude at once the dangers of Mysticism and pave the way for a genuine physiological psychology or psychobiology, which is portrayed in the third chapter.

While being opposed to the Freudian movement, the author asserts the opinion, however, that its final result may be beneficial. Just as Christian Science has tremendously accelerated the progress of scientific medicine, so psychoanalysis, by compelling psychology to put its own house in order, will eventually help in the development of Scientific Psychology. But in the fear that in the meantime many may be deluded into the "short-cut" methods of Mysticism and Freudianism rather than adhering to the slower but more solid procedure of science, this book was written.

Clark University. CLINTON S. LEONARD.

W. WHATELY SMITH. *"The Foundation of Spiritualism."* E. P. Dutton & Company, New York, 1920, p. 123.

This book is a discussion of the fundamental bases of spiritualism. The author examines the various phenomena which serve as a foundation upon which the claims of spiritualists are built.

A large part of the book is taken up in analyzing the spiritualistic phenomena which are used as evidence for survival and gives some instances of automatic writing which seem to show that departed spirits take some interest in, and maintain some measure of contact with, the world they have left. He also takes up the arguments against the spiritistic hypothesis and says that "the true case against the

spiritistic hypothesis is simply that our knowledge of abnormal psychology is not, at present, extensive enough to admit of our assigning definite limits to what can be achieved by the incarnate mind under suitable conditions, and that, until we are in a position to do so with reasonable precision, we cannot possibly say that any particular feat is beyond its powers and therefore necessarily due to the interventions of discarnate intelligences." Part II of the book has to do with "The Process of Communication" and the author concludes that the whole subject is so obscure "that it is at present premature to express any opinion whatever as to the nature of the next life." He does, however, suggest a few conclusions as to the nature of the individual in the next life. The author is somewhat shaky in his conclusions and admits that a great deal of the evidence is unreliable and perhaps only about 5% is dependable. It is hard therefore to sift the reliable evidence from the unreliable. He states that wholesale denial of the facts of spiritualism merely displays ignorance of the subject and concludes that "the subject is one which should be dealt with exclusively by the expert and not the amateur," and that spiritualism is to be deprecated "because of the scientific immaturity of the whole subject, the great difficulties connected with it, the unfortunate tendency of Spiritualists to indulge in unwarrantable, and sometimes heterodox extrapolations from the facts, and the ever-present danger that their uninstructed adherents accept as inspired revelation matter which is really no more than the product of incarnate subliminal activities."

The author's style is clear, the method analytic. He assumes a critical attitude throughout and weighs carefully the evidence in favor of and against survival. The book is a sane analysis of spiritistic phenomena and should prove helpful as a careful and critical review to all interested in Spiritualism. M. MEENES.

Courtis Standard Practice Tests in Handwriting. By STUART A. COURTIS and LENA A. SHAW. Specimen Set, 50 cents postpaid. Yonkers-on-Hudson, New York: World Book Company.

This material, like the Courtis Standard Practice Tests in Arithmetic, is thoroughly standardized. Three years' trial in schools, before it was placed on the market, left no doubt on its success in use.

Convinced that writing is a trick which the pupil must learn for himself, though his teacher may help him at times, the authors have placed before the child definite attainable goals, based on standards, and have provided exercises that enable him to reach those goals. Through these exercises, the individual needs of the children are met and the routine of classroom work is avoided. Children learn quickly how to use the material, and enjoy using it.

Standard research and supervisory tests are included in the material; by their use it is easy to discover just what kind of drill work children need, and how much.

The results from using the tests are very remarkable, many instances showing that even with less practice time than usual, children doubled their speed and quality of writing when they had used the Courtis Standard Practice Tests in Handwriting.

Bulletin No. 1 gives complete information on the material.

ORDWAY TEAD and HENRY C. METCALF. *Personnel Administration.* McGraw-Hill Book Company, New York, 1920. pp. 538.

In "Personnel Administration" the authors are offering the public a most timely book. While they may appear to be somewhat premature

in setting forth in a systematized manner the "principles" and "standard practices" of a field so new and unformed as that of the administration of human relations in industry, it is in just this respect that the authors are performing an extremely useful service. They have taken the bewildering mass of written material relative to this extensive topic and have subjected it to a critical examination, careful selection and classification before putting it in book form, and so have answered a definite need. It is in this work of expert organization and sifting of the sources rather than in the originality of the data presented in which the writers of this volume have made their greatest contribution. An additional feature which makes the book valuable is the voluminous and excellently classified bibliography given at the close of each chapter.

The volume will be useful as a handbook as well as a text for class purposes, and will have value to all "who are interested to advance right human relations in industry," be they social welfare workers, students of industrial problems, the workmen themselves, consumers or the managers. A clear, concise discussion is given of the various elements that constitute the science of personnel administration. The more important of the numerous methods that are being successfully employed by progressive industries are related, and significant generalizations are drawn from this material. The book does not propose to offer a panacea for all industrial ills. It does claim, and the claim seems to be justified, to contain a method that is working in the right direction, and bases its claim on the success which has attended the application of these principles wherever they have been properly applied.

In the estimation of the reviewer, the authors wisely urge the point that the problem of directing human beings is a permanent one, i.e., that it will remain wherever and so long as there exists the "relationship of employer and employed, of manager and managed," and this entirely independent "of the problem of ownership in industry." So long as this dual relationship in industry exists—and this seems to be *ad infinitum*—the problems involved in engaging men and in directing their activities while at work will remain no matter how often the ownership of industry changes. If the problem is inherent in industrial society, it is clear that a complete solution cannot well be devised over night, and that a wider and more systematic study of the underlying principles that will make for as little friction as possible in our industrial organization is of great importance.

Chapter II on "Human Values in Industry" reiterates, ably though only briefly, yet again the need of reckoning with the indispensable human factor without which no concern can long exist. The chapter is based on the fundamental human instincts and urges anew that they are found universally in the managed as well as in the managing, a consideration that has too long been neglected with unfortunate results as a consequence. To be sure, "it is manifestly true that in a majority of corporations production is to-day affected adversely not so much because of technical inadequacies as because of the failure of managers to recognize that workers are human beings who demand the considerate treatment which only intelligence and insight regarding human nature can suggest."

In reading this book one is impressed with the bigness of the task of personality direction and with the tremendously large, delicate and intricate machinery it necessitates creating to successfully man-

age this human section of modern industry. The nature of the problems involved, their implication to the welfare of society at large, and their bearing upon the productiveness of industry, these elements elevate the profession of personnel administration to a high plane and first rank in industry. This point is stressed by the authors calling attention to the fact that upon sympathetic interest, mature judgment and adequate preparation in the social sciences depends the successful direction of so delicate and responsible a task as that involved in this calling.

All those interested in producing and maintaining cordial human relations in the industrial world will welcome this excellent text on personnel administration.

Clark University G. T. SCHWENNING.

DAVID E. BERG. *Personality culture by College Faculties.* Institute for Public Service, N. Y. City, cloth, 128 pp. $1.50.

This is a study of 72 university instructors in 100 classes in 25 subjects. A summer was devoted to visiting the classes. A description of each teacher as seen from the viewpoint of the students is given. Early observations of eight instructors revealed the examples of personalities ranging from the "zenith to the nadir" in teaching ability,—"the poor teaching power being due to correctable faults of personality." With each group of personality portraits from the "lower levels" in personality to the "personalities plus," is given the outstanding personality elements that determine the classification Each picture is so fully described as to show clearly those qualities of personality that should be cultivated and those avoided.

Of a total of twenty-two there were eight of high class personality, six medium and eight of defective personality.

Some of the desirable volitional elements listed are "exacting, moral courage, aggressiveness, decisiveness, dynamic" and among the opposite are "laxity, subservience, timidity, irresolution, discouraging." The 72 instructors as the result of analysis and classification fall into 10 grades of teaching ability. It is the hope of the author that this attempt to distinguish these various grades of teaching ability may stimulate teachers toward self-analysis of their own ability and encourage colleges to consider more comprehensively the subject of teaching personality.

Every college is urged to organize a committee to study teaching personality and efficiency and give the committee power to study, analyze and formulate recommendations for improvement, that this committee formulate minimum standards of teaching personality, and study their own pedagogical problems.

This book has a fact basis for its content, and its concreteness will enable it to be of valuable service to present teachers and teachers-to-be.

NOTE

Funds for Scientific Research

The Research Information Service of the National Research Council has recently compiled information about funds for scientific research. From this compilation it appears that there are hundreds of special funds, trusts, or foundations for the encouragement or support of research, in the mathematical, physical and biological sciences, and their applications in engineering, medicine, agriculture and other useful arts. The income from these funds, which amounts annually to at least fifty million dollars, is used principally for prizes, medals, research scholarships and fellowships, grants and sustaining appropriations or endowments.

So numerous have been the requests to the Research Council for information about sources of research funds, availability of support for specific projects and mode of administration of particular trusts or foundations, that the Research Information Service has created a special file which it is proposed to keep up to date in order to answer the questions of those interested in such funds. Furthermore, in order to give wider publicity to the immediately available information about research funds, the Council has issued a bulletin under the title "*Funds available in 1920 in the United States of America for the encouragement of scientific research.*"

Inquiries concerning the bulletin or for information about research funds should be addressed, National Research Council, Information Service, 1701 Massachusetts Avenue, Washington, D. C.

The following books and pamphlets have been received:*

Army Lessons in English (7 copies). School Office, Recruit Educational Center, Camp Upton, N. Y.

Bureau of Business Research, New York University. Attention Value of Advertisements. The Graduate School of Business Administration of New York University, November, 1920. pp. 32.

Commissioner of Education. A Survey of Education in Hawaii. Washington Government Printing Office, 1920. pp. 408.

Education for Citizenship. Washington Government Printing Office, 1921. pp. 30.

Education for Highway Engineering and Highway Transport. Dept. of the Interior. Washington Government Printing Office, 1921. pp. 134.

Mabel R. Fernald, Mary H. S. Hayes and Almena Dawley. A Study of Women Delinquents in N. Y. State. The Century Co., 353 Fourth Ave., New York City, 1920. pp. 542.

E. H. Fish. How to Manage Men. The Engineering Magazine Co., New York, 1920. pp. 337.

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* Mention here does not preclude further comment

Edward A. Fitzpatrick. Genesis and Purpose of Vocational School Survey, Beginnings of Continuation Schools in Wisconsin, History of Continuation Schools in Wisconsin. State Board of Education, Madison, Wisconsin, 1921. pp. 23.

Capt. J. M. Hanson (Editor). The Inter-Allied Games. Games Committee, 1919. pp. 511.

Prof. G. B. Hotchkiss, R. B. Franken. Newspaper Reading Habits of College Students. Association of National Advertisers, Inc., New York City. pp. 15.

Hoyt and Peet. Everyday Arithmetic, Primary. Houghton Mifflin Co., Boston, New York, Chicago, 1920. pp. 276.

Hoyt and Peet. Everyday Arithmetic, Intermediate. Houghton Mifflin Co., Boston, New York, Chicago, 1920. pp. 276.

Hoyt and Peet. Everyday Arithmetic, Advanced. Houghton Mifflin Co., Boston, New York, Chicago, 1920. pp. 324.

Principles, Plans and Purposes of the Educational Program of the Recruit Educational Center, Camp Upton, N. Y., 1920. pp. 19.

Luella Cole Pressey. The Relation of Intelligence to Achievement in the Second Grade. From Bulletin of Extension Division, Indiana University, Vol. VI, No. 1. pp. 80.

National Intelligence Tests. World Book Co., New York, 1920. pp. 32.

Carl E. Seashore. A Survey of Musical Talent in the Public Schools. University of Iowa, Iowa City, 1920. pp. 36.